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HS-013 537 - HS-013 603
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HS-845 016-018; 020; 022-025

U.S. Department of
Transportation

National Highway
Traffic Safety
Administration



*Shelve in stacks
S.B.T.*

Highway Safety Literature

... A SEMI-MONTHLY ABSTRACT JOURNAL

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SAMPLE ENTRIES

JOURNAL ENTRY

Title of Document { **SYNTHESIS OF CASE LAW JURISPRUDENCE RELATING TO WET-WEATHER HIGHWAY CONDITIONS**

Journal Citation → Highway Research Record n 376 p29-36 (1971)
D. C. Oliver 1971

Author(s) → Sponsored by Highway Res. Board Steering Com. for Workshop on Anti-Skid Program Management and presented at the workshop.

Search Terms { Descriptors: *Liability, *Negligence, *Accident responsibility, *Legal responsibility, *Wet road conditions, *Court decisions, *State government, *Skidding accidents, *Warning signs, *Highway maintenance, *Litigation, *Icy road conditions,

Abstract { The extant case law on legal liability for accidents occurring on icy and wet highways has established three central areas and one subarea in the jurisprudence of maintenance liability. These areas are compliance with general duties in order to escape liability; damages resulting from noncompliance (negligence); contributory negligence as a bar to recovery; and advisory signing as a technique in meeting general duties. Court decisions covering these four areas are presented.

NHTSA Accession Number → HS-012 289
*Subject heading in Subject Index

CONTRACT REPORT

EQUIPMENT AND PROCEDURES FOR MEASURING GLARE FOR MOTOR VEHICLES. FINAL REPORT

Corporate author → Teledyne Brown Engineering
N. E. Chatterton J. D. Hayes E. W. George 1972 102p
Contract DOT-HS-089-1-139

Availability → NTIS

Descriptors: *Glare, *Glare reduction, *Visual perception, *Photometers, *Luminance, *Hydraulic equipment, *Central vision, *Field of view, *Backgrounds, *Contrast, *Light conditions, *Brightness, *Test facilities, *Test equipment, *Vehicle safety standards, *Simulators, *Light, *Reflectance, *Measuring instruments,

A procedure and description of equipment for measuring glare from a driver's own vehicle are presented. The procedures are based on a disability glare theory as applied to foveal vision. Two pieces of apparatus were constructed to provide the measurement capability. One of them simulates diffuse sky glare and the other simulates direct solar glare. Methods of combining data from these measurements are presented along with scaling laws selected to provide a value for glare as it would be under natural daylight conditions. A standard for allowable glare levels from the vehicle is developed which is independent of the measurement procedure. Test results from a passenger car are presented and compared with this standard. Recommendations for improvements to the apparatus and additional research requirements for improvement to the theory are made.

HS-800 731
*Subject heading in Subject Index

1A. Emergency Services

MOTOR VEHICLE FIRE SAFETY

Transportation Fire Hazards, 1973 p25-9

Corporate author

Vehicle fires, Fire prevention, Transportation of hazardous materials, Vehicle safety standards, Federal role, Industries, Flammability tests, Fire extinguishers, Fuel tank location, Crashworthy fuel systems

More than 450,000 fires occurred in private passenger cars and trucks in the United States in 1971. The average loss in those fires was —200, and there were between 3,500 and 4,000 deaths. The National Fire Protection Association has developed standards for transportation of specific hazardous materials by trucks; protection of vehicle occupants from fire; and parking and garaging of trucks. The American Trucking Association and the explosives industry provide information on the prevention of explosions and vehicle fires. Federal Motor Vehicle Safety Standards based on flammability and impact tests cover flammability of interior materials for automobiles, trucks, and buses; fuel system crashworthiness; and fuel tank location.
HS-013 551

AUTOMATED TRAFFIC RECORDS SYSTEM. PHASE 2. EMERGENCY MESSAGE SWITCHING. FINAL REPORT

117P

Grant 117211-516

Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Automatic emergency reporting systems, Police cooperation with other agencies, Radio communication, Emergency services, Computerized records management, Computerized dispatching systems, Proposals, Systems analysis, Traffic records, Economic factors, Traffic volume, Warning systems, Information system design, Program evaluation

A model communication system, which integrates automated traffic records and emergency resource inventories with a computerized command and control system, is proposed. The system constraints, requirements, and design concept are described and implementation costs are given. An evaluation of the project study by Justice Research Associates is included.
HS-845 024

1B. Injuries

INTERIOR SAFETY OF AUTOMOBILES--A STUDY OF THE GERMAN MOTOR INSURERS ON ROAD ACCIDENTS INVOLVING PASSENGER INJURIES

HUK-Verband (West Germany)

For primary bibliographic entry see Fld. 1C.

HS-013 541

INTERIOR SAFETY OF AUTOMOBILES

HUK-Verband (West Germany)

K. Langwieder 1972

p2-217--2-220

Accident studies, Passenger injuries, Injuries by accident type, Injury causes, Front end collisions, Intersection collisions, Rear end collisions, Damage patterns, Fatality rates, Injury rates, Injuries by seat occupation, Damage severity, Seat belt effectiveness, Impact velocity

An analysis of passenger injury accidents is being conducted in Germany. Among the 10,271 accidents evaluated so far 41.3% were intersection accidents, 30.2% were rear end collisions, and 28.5% were front end accidents. Passenger injuries by accident type, frequency of interior damage, injuries by seat occupation, and safety belt effectiveness in the accidents studied are discussed.

HS-013 542

HUMAN IMPACT RESPONSE, MEASUREMENT AND SIMULATION. SYMPOSIUM PROCEEDINGS, WARREN, MICHIGAN, OCTOBER 2-3, 1972

General Motors Res. Labs., Warren, Mich.

For primary bibliographic entry see Fld. 3B.

HS-013 579

TRAUMA EVALUATION NEEDS

Rochester Univ., N. Y.

J. D. States 1973 26refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p3-16

Injury research, Injury case reports, Human body simulation, Injury rates, Whiplash injuries, Abdominal injuries, Seat belt caused injuries, Seat design, Injury causes, Human body kinematics, Injury prevention, Leg injuries, Arthritis, Motorcycle operator injuries, Pedestrian injuries, Joints (anatomy)

Neck injuries remain one of the most common accident injuries. Kinematics and neck injury mechanisms are currently under research scrutiny and hopefully will permit the design and construction of improved injury indicating simulations. Restraint systems continue to cause injury which may be reduced or prevented by introducing some of the design features of bucket seats used in racing vehicles. Improved simulations of the human abdomen and hips are essential for the development of such seats for passenger car use. Joint injury causes traumatic arthritis which may cause profound permanent disability. Improved injury indicating simulations of joints are necessary for further research to prevent joint injuries. Motorcyclists and pedestrians appear to have become the most frequent victims of serious lower extremity injuries. Improved lower extremity simulations and the use of animal joints will facilitate the development of injury reducing designs for motorcycles and vehicle front ends.
HS-013 580

COMPARISON OF DYNAMIC RESPONSE OF HUMANS AND TEST DEVICES (DUMMIES)

Wayne State Univ., Detroit, Mich.

For primary bibliographic entry see Fld. 3B.

HS-013 581

DUMMY PERFORMANCE IN CRASH SIMULATION ENVIRONMENTS

National Hwy. Traf. Safety Administration, Washington, D.C.

Group 1B—Injuries

For primary bibliographic entry see Fld. 3B.
HS-013 583

BIOMECHANICAL ASPECTS OF HEAD INJURY

Michigan Univ., Ann Arbor
J. H. McElhaney, R. L. Stalnaker, V. L. Roberts 1973 24refs
In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p85-112

Biomechanics, Head injuries, Head impact tolerances, Head acceleration tolerances, Human body mechanical impedance, Injury severity index, Injury prediction, Injury research, Deflection, Dynamic models, Acceleration pulses, Animal experiments, Cadavers in testing, Dynamic tests, Static tests, Loading (mechanical)

A viable head injury criterion must provide appropriate mechanisms that realistically account for the relations of head impact tolerance and impulse duration and direction. The development of the Mean Strain Criterion, which considers the total linear acceleration history of the head but assumes a single injury mechanism, is discussed. Various head injury criteria, including the Wayne State Tolerance Curve, the Gadd Severity Index, the Head Injury Criterion, the Vienna Institute Index, the Effective Displacement Index, and the Revised Brain Model, are described and compared. The results of a series of impact and static load deflection tests aimed at establishing force-time and acceleration time histories for fresh cadaver heads to allow the specification of the appropriate impact responses of a new generation of crash test device heads are also presented.

HS-013 584

A BASIS FOR CRASH DUMMY SKULL AND HEAD GEOMETRY

General Motors Res. Labs., Warren, Mich.
For primary bibliographic entry see Fld. 3B.
HS-013 585

HUMAN TORSO RESPONSE TO BLUNT TRAUMA

Michigan Univ., Ann Arbor; Michigan Univ., Ann Arbor. Medical Center
R. L. Stalnaker, J. H. McElhaney, V. L. Roberts, M. L. Trollope 1973 16refs
In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p181-99

Injury research, Cadavers in testing, Abdominal injuries, Animal experiments, Abdominal impact tolerances, Liver injuries, Accident simulation, Injury severity, Static compression tests, Monkeys, Baboons, Swine, Test equipment, Impact forces, Chest impact tolerances, Linear regression analysis, Impact velocity, Dimensional analysis, Rib fractures, Test volunteers, Deflection, Stiffness, Injuries by body area

A series of animal abdominal impacts were designed to study the relationship between shape and type of impactor, impact velocity and direction, body region impacted, and injury level. A positive correlation was found between the degree of abdominal injury and the force surface area, animal mass, and duration of impact in pigs and three species of primates. A cadaver program was initiated as part of the human impact response study. Cadavers were impacted on the front of the chest over the fourth rib. The velocity of the impact and the mass of the impactor were held constant. Static compression tests were also conducted on the chest in the anterior-posterior direction using both cadavers and human volunteers. The

results are given as load deflection curves with comparison to previous published data.
HS-013 587

EVALUATION OF DUMMY NECK PERFORMANCE

Michigan Univ., Ann Arbor
For primary bibliographic entry see Fld. 3B.
HS-013 588

PRELIMINARY DISCUSSION OF AN APPROACH TO MODELING LIVING HUMAN HEAD AND NECK TO -G SUB x IMPACT ACCELERATION

Naval Aerospace Medical Res. Lab., Pensacola, Fla.
For primary bibliographic entry see Fld. 3B.
HS-013 590

NEW ADVANCES IN VOLITIONAL HUMAN MOBILITY SIMULATION

Michigan Univ., Ann Arbor
For primary bibliographic entry see Fld. 3B.
HS-013 591

VALIDATION OF A THREE-DIMENSIONAL MATHEMATICAL MODEL OF THE CRASH VICTIM

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
For primary bibliographic entry see Fld. 3B.
HS-013 592

KINEMATIC ANALYSIS OF HUMAN VOLUNTEER TESTS

Michigan Univ., Ann Arbor
For primary bibliographic entry see Fld. 3B.
HS-013 593

BIOMECHANICS IN CRASH INJURY RESEARCH

General Motors Res. Labs., Warren, Mich.
C. K. Kroell, C. W. Gadd, D. C. Schneider 1973 22p 22refs
Rept. No. GMR-1358
Presented at International Instrument Society of America Aerospace Instrumentation Symposium (19th), Las Vegas, Nev., 21-23 May 1973.
Corporate author

Injury research, Biomechanics, Impact tests, Head impact tolerances, Chest impact tolerances, Knee impact tolerances, Neck impact tolerances, Cadavers in testing, Impact sleds, Femurs, Pelvic injuries, Fractures, Deflection, Test volunteers, Impact velocity, Loading (mechanical), Sex factors, Human deceleration tolerances, Oscillographs

Studies of skeletal injury to the knee-thigh-hip complex produced patella, femur, and pelvis fractures at levels ranging from 1500 to 3800 pounds. Using a shock-cord-propelled impactor, thoracic force-deflection characteristics of cadavers demonstrated strong velocity sensitivity. A study using human volunteers demonstrated increased thoracic stiffness associated with upper body muscle tensing. Neck tolerance and response to laryngeal impact and to hyperextension and lateral flexion for unembalmed cadavers was investigated. Fracture of the cricoid and thyroid cartilages and incipient tissue straining from angulation occurred at levels of 100 lbs and 150-300 lb-in about the base of the neck, respectively. Skull and facial bone impact tolerance was studied using a drop weight impactor. Fracture force levels ranged from 150-900 lbs. A study involving an in-

December 28, 1973

ACCIDENTS—Field 1

Investigation And Records—Group 1C

strumented circus performer high diving into a foam filled mattress was used to measure whole body deceleration tolerance.
HS-013 595

AN ASSESSMENT OF THE PERFORMANCE OF BELT RESTRAINT SYSTEMS IN AUTOMOBILE CRASHES

National Hwy. Traf. Safety Administration, Washington, D.C.
For primary bibliographic entry see Fld. 5N.
HS-820 286

1C. Investigation And Records

THE FIAT TECHNICAL PRESENTATION

Fiat S.p.A., Turin (Italy)
For primary bibliographic entry see Fld. 5D.
HS-013 537

INTERIOR SAFETY OF AUTOMOBILES--A STUDY OF THE GERMAN MOTOR INSURERS ON ROAD ACCIDENTS INVOLVING PASSENGER INJURIES

HUK-Verband (West Germany)
M. Danner 1972
In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-213-2-216

Accident investigation, Data acquisition, Electronic accident analysis, Injury classification, Damage severity, Damage patterns, Injury causes, Accident report forms, Research methods, Coding systems

The accident data acquisition and analysis methods used by the Federation of Motor Insurers to study the causes of passenger injuries are briefly discussed. It is felt that accident studies on a large scale can be used to evaluate the effectiveness of vehicle safety measures.
HS-013 541

INTERIOR SAFETY OF AUTOMOBILES

HUK-Verband (West Germany)
For primary bibliographic entry see Fld. 1B.
HS-013 542

RAILROAD/HIGHWAY ACCIDENT REPORT. PENN CENTRAL FREIGHT TRAIN/SCHOOLBUS COLLISION NEAR CONGERS, NEW YORK, MARCH 24, 1972.

47P Rept. No. NTSB-RHR-73-1, SS-R/H-6
Corporate author

Railroad grade crossing accidents, School bus accidents, Vehicle train collisions, Accident case reports, Accident analysis, Driver error caused accidents, Accident investigation, New York (State), Passenger injuries, Passenger fatalities, Accident diagrams, Accident location, School bus bodies, Environmental factors, Accident factors, School bus drivers, Occupant rescue, Damage, Injury severity, School bus passengers, Traffic laws, Stop signs, Sign effectiveness, Precrash phase, Crash phase, Postcrash phase, Injury causes, Seat belt effectiveness, Human body precrash position

An eastbound school bus was driven across a grade crossing and was struck by the lead locomotive of a northbound freight train. After impact the school bus was driven 1,116 feet down

the track by the train, and the body structure of the bus disintegrated. The rear section of the bus was torn loose, fell beside the track, and overturned with a number of students underneath. Five students died, and the bus driver and all 44 remaining students were injured. None of the train crew was injured. The cause of the accident was the failure of the school bus driver to stop at the stop sign until the crossing was clear of railroad traffic. Contributing to the accident was the unnecessary routing of the school bus over a not specially protected railroad/highway grade crossing.
HS-013 558

ROAD RESEARCH 1971. ANNUAL REPORT OF THE ROAD RESEARCH LABORATORY 147P 88REFS

Her Majesty's Stationery Office

Road Res. Lab., Annual reports, Transportation planning, Urban transportation, Traffic research, Transportation studies, Traffic management, Traffic control, Highway safety, Accident analysis, Vehicle safety, Driver behavior research, Pedestrian behavior, Driver aid systems, Highway design, Pavements, Safety programs, Safety research, Accident investigation, Transportation systems, Bridge design, Environmental factors, Highway environmental impact, Tunnel design, Salt effects, Highway construction, Road materials, Highway planning, Public transportation, Highway transportation, Traffic engineering, Highway engineering, Economic analysis, Traffic noise, Child safety, Speed volume relationships

In highway engineering the Laboratory is concerned with the planning, design, construction, and maintenance of roads and highway structures, particularly bridges and tunnels. In traffic engineering and safety the aim is to develop improved methods for the safe, efficient, and convenient movement of people and goods. In transportation research the Laboratory is involved in examining transport operations and their interactions with industrial, commercial, residential, and recreational activities. Selected highlights of work in progress, including automated public transport; economic assessment of alternative policies for traffic restraint; traffic noise; channel tunnel ferry wagons; speed/flow relations on suburban main roads; child safety; car safety program; road salting and vehicle corrosion; rural hydrology; and accelerated methods of testing concrete are presented. Current research, in progress or completed, conducted by the transportation, traffic safety, design, construction, central services, and administration divisions is summarized.

HS-013 560

TRAUMA EVALUATION NEEDS

Rochester Univ., N. Y.
For primary bibliographic entry see Fld. 1B.
HS-013 580

CLASSIFICATIONS OF DRIVING EXPOSURE AND ACCIDENT RATES FOR HIGHWAY SAFETY ANALYSIS

For primary bibliographic entry see Fld. 3D.
HS-013 597

THE CONCEPT OF EXPOSURE

Accident Analysis and Prevention v5 p95-110 (1973)
R. Chapman 1973 84refs
Accident Analysis and Prevention v5 p95-110 (1973)

Group 1C—Investigation And Records

Accident risk forecasting, Driver mileage, Accident research, Highway accident potential, Head on collisions, Rear end collisions, Intersection collisions, Traffic flow, Signalized intersections, Accident rates, Reviews

Exposure is a concept which tries to take account of the amount of opportunity for accidents which the driver or the traffic system experiences. Exposure literature covering such topics as exposure for large areas, groups, or times; induced exposure measures; exposure as opportunities; specific exposure at locations, to persons, or in time is reviewed.

HS-013 598

INDUCED EXPOSURE

Accident Analysis and Prevention v5 p111-26 (1973)

A. Haight 1973 17refs

Portion of this paper originally appeared in HS-800 601 'Indirect Methods for Measuring Exposure Factors as Related to the Incidence of Motor Vehicle Traffic Accidents. Final Report.' Accident Analysis and Prevention v5 p111-26 (1973)

Accident risk forecasting, Single vehicle accidents, Vehicle vehicle collisions, Highway accident potential, Accident responsibility, Traffic density, Accident proneness, Gravity models, Mathematical analysis

Induced exposure in the narrow sense refers to exposure to vehicular collision only, and is modelled by a scheme which equates the proportion of single vehicle collisions experienced by a category of driver/vehicles to the proportion of double vehicle collisions in which that driver/vehicle combination was guilty, and which equates the exposure for the category to the proportion not guilty in double vehicle collisions. Induced exposure in the wide sense refers to all types of hazard, and separates the data into four categories by a hypothesis that factors relating to an accident are either internal or external for each of the two driver/vehicle combinations involved, where, for single car collisions, one of the driver/vehicle categories is the type of accident, with the restriction that internal factors do not exist in the case where driver/vehicle represents type of single vehicle accident.

HS-013 599

A PILOT STUDY OF OBSERVED AND INDUCED EXPOSURE TO TRAFFIC ACCIDENTS

Accident Analysis and Prevention v5 p127-36 (1973)

H. C. Jokschi 1973 11refs

Accident Analysis and Prevention v5 p127-36 (1973)

Accident risk forecasting, Sex factor in accidents, Driver mileage, Male drivers, Female drivers, Highway accident potential, Poisson density functions, Single vehicle accidents, Vehicle vehicle collisions, Accident rates, Chi square test, Degrees of freedom, Time factors, Hartford, Mathematical analysis

An experiment was conducted in 1967 to evaluate the exposure of male and female drivers in Hartford, Connecticut, and to compare the results with reported accident involvement. A modified form of Thorpe's induced exposure method is applied to the data. A tentative conclusion is that the relative risk for women was about 50% higher than for men.

HS-013 600

A MODEL FOR ESTIMATION OF COLLECTIVE EXPOSURE AND PRONENESS FROM ACCIDENT DATA

For primary bibliographic entry see Fld. 4G.

HS-013 601

EMPIRICAL RESULTS ON THE EXPOSURE-PRONENESS MODEL

Accident Analysis and Prevention v5 p175-89 (1973)

M. J. Koornstra 1973 4refs

Accident Analysis and Prevention v5 p175-89 (1973)

Accident risk forecasting, Accident proneness, Accident statistics, Statistical analysis, Age factor in accidents, Validation, Matrix reduction, Sex factor in accidents, Eigenvalues, Least squares method, Chi square test, Variance analysis, Parameters, Degrees of freedom, Driver experience, Single vehicle accidents, Vehicle vehicle collisions, Mathematical analysis

The applicability and validity of the exposure-proneness model is investigated by the analysis of two sets of empirical data. The concept of comparable behavioral maneuverability is introduced and a slight revision of the model and its solution are given in order to explain the fits and departures of the model for these data. Within the range of applicability the model gives a statistically acceptable fit. The accident proneness of private cars is at least twice, but probably five times larger than the proneness of other classes. The relation between age and proneness is curved; for the age group of 18-24 it is five times higher than for age group 45-55, and for ages about 55 one and one-half to five times higher than it is for the group of 45-55.

HS-013 602

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 1. COURSE GUIDE

Dunlap and Associates, Inc., Darien, Conn.

For primary bibliographic entry see Fld. 2H.

HS-800 718

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 2. INSTRUCTOR'S LESSON PLANS

Dunlap and Associates, Inc., Darien, Conn.

For primary bibliographic entry see Fld. 2H.

HS-800 719

GLENDORA PEDESTRIAN SAFETY STUDY

Glendora Engineering Dept., Calif.

For primary bibliographic entry see Fld. 3K.

HS-845 020

2. HIGHWAY SAFETY**A MODEL FOR ESTIMATION OF COLLECTIVE EXPOSURE AND PRONENESS FROM ACCIDENT DATA**

For primary bibliographic entry see Fld. 4G.

HS-013 601

EMPIRICAL RESULTS ON THE EXPOSURE-PRONENESS MODEL

For primary bibliographic entry see Fld. 1C.

HS-013 602

GLENDORA PEDESTRIAN SAFETY STUDY

Glendora Engineering Dept., Calif.

For primary bibliographic entry see Fld. 3K.

HS-845 020

2. HIGHWAY SAFETY**2B. Communications****FEASIBILITY STUDY OF CLOSED CIRCUIT TELEVISION FOR TRAFFIC SURVEILLANCE**

California Dept. of Public Works, Sacramento
M. S. MacCalden, Jr., R. W. Anderson, M. M. Morshed 1973
94p

Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Traffic surveillance, Closed circuit television, Feasibility studies, Accident surveillance, Driver aid systems, Benefit cost analysis, Emergency road services, Traffic management, Emergency reporting systems, Videotapes, Time factors, Accident rates, Accident analysis, Disabled vehicles, Accident prevention, Traffic delay, Waiting time, California

As part of a continuing effort to improve safety and efficiency, a closed circuit television (CCTV) system was tested on the San Francisco-Oakland Bay Bridge. Four television cameras were installed on the upper deck of the West Bay suspension spans. These cameras provide the opportunity to monitor traffic on two miles of roadway from a central location and to detect and dispatch help to traffic incidents. The objective of the test was to evaluate both the technical feasibility of CCTV and its effectiveness in speeding up the detection and removal of disabled vehicles. It was concluded that the closed circuit television is technically feasible and is an effective tool for traffic surveillance on the Bay Bridge. The pilot installation is cost effective and should be continued and used operationally. However, it is recommended that its use not be expanded to the entire bridge pending analysis of total traffic management needs on the bridge.

HS-845 016

AUTOMATED TRAFFIC RECORDS SYSTEM. PHASE 2. EMERGENCY MESSAGE SWITCHING. FINAL REPORT

117P
Grant 117211-516

Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Automatic emergency reporting systems, Police cooperation with other agencies, Radio communication, Emergency services, Computerized records management, Computerized dispatching systems, Proposals, Systems analysis, Traffic records, Economic factors, Traffic volume, Warning systems, Information system design, Program evaluation

A model communication system, which integrates automated traffic records and emergency resource inventories with a computerized command and control system, is proposed. The system constraints, requirements, and design concept are described and implementation costs are given. An evaluation of the project study by Justice Research Associates is included.

HS-845 024

2D. Design And Construction**ROAD RESEARCH 1971. ANNUAL REPORT OF THE ROAD RESEARCH LABORATORY 147P 88REFS**

Her Majesty's Stationery Office

Road Res. Lab., Annual reports, Transportation planning, Urban transportation, Traffic research, Transportation studies, Traffic management, Traffic control, Highway safety, Accident analysis, Vehicle safety, Driver behavior research, Pedestrian behavior, Driver aid systems, Highway design, Pavements, Safety programs, Safety research, Accident investigation, Transportation systems, Bridge design, Environmental factors, Highway environmental impact, Tunnel design, Salt effects, Highway construction, Road materials, Highway planning, Public transportation, Highway transportation, Traffic engineering, Highway engineering, Economic analysis, Traffic noise, Child safety, Speed volume relationships

In highway engineering the Laboratory is concerned with the planning, design, construction, and maintenance of roads and highway structures, particularly bridges and tunnels. In traffic engineering and safety the aim is to develop improved methods for the safe, efficient, and convenient movement of people and goods. In transportation research the Laboratory is involved in examining transport operations and their interactions with industrial, commercial, residential, and recreational activities. Selected highlights of work in progress, including automated public transport; economic assessment of alternative policies for traffic restraint; traffic noise; channel tunnel ferry wagons; speed/flow relations on suburban main roads; child safety; car safety program; road salting and vehicle corrosion; rural hydrology; and accelerated methods of testing concrete are presented. Current research, in progress or completed, conducted by the transportation, traffic safety, design, construction, central services, and administration divisions is summarized.

HS-013 560

2G. Meteorological Conditions**CARS GO RUSTY. AN ANALYSIS OF CERTAIN TYPES OF CORROSION IN PASSENGER CARS**

64P
Corporate author

Corrosion, Corrosion prevention, Automobile models, Humidity, Deposition, Fatigue (materials), Pitting, Water effects, Temperature, Air pollution effect on materials, Chlorides, Vehicle inspection, Coatings, Spraying, Galvanic corrosion

The main types of corrosion are crevice corrosion, deposition, corrosion fatigue, pitting, and galvanic corrosion. Methods of assessing rust damage in vehicle inspection are outlined. Rust damage begins to acquire notable proportions when cars reach the age of five years. The frequency of remarks then rises uninterruptedly, culminating when the cars reach the age of 11-12 years. Examples are given of the places in which corrosion most commonly occurs in the BMC 850, BMW 2000, Fiat 124, Citroen ID/DS, Ford Cortina, Ford Taunus 17M, Mercedes-Benz 190/200, Opel Rekford, Opel Kadett, Peugeot 404, Renault 4, Saab 96, Vauxhall Viva, Volkswagen Type 1 1200/1300, Volkswagen Type 3 1500/1600, Volvo 121/131

Group 2G—Meteorological Conditions

Amazon, and the Volvo 111 PV 544. Corrosion can be prevented by proper cleaning and drying, spraying, and finishing off, and by garaging the car. Instructions for the assessment of corrosion and for repairing rust damage are included.
HS-013 562

2H. Police Traffic Services

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 1. COURSE GUIDE

Dunlap and Associates, Inc., Darien, Conn.
A. Hale, J. W. 1972 46P 69REFS
Contract DOT-HS-099-1-137
GPO \$0.60

Police training, Police traffic services, Curricula, Traffic law enforcement, Emergency services, Accident investigation, Traffic courts, Police motorist contacts

This course has been developed with the primary intent of providing basic operational training in police traffic services (PTS) for a pre-service, recruit trainee intending to become a patrolman for a municipal, county, or state level law enforcement agency. This guide, which was prepared as an aid for the course training administrator, contains: a description of the overall training program; suggestions for course planning including the scheduling of lessons, class size, prerequisites for students and instructors, training facilities and resources, and instructor and student material; guidelines for conducting the course; and recommendations for measuring student achievement.

HS-800 718

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 2. INSTRUCTOR'S LESSON PLANS

Dunlap and Associates, Inc., Darien, Conn.
A. Hale, J. W. Hamilton 1972 566p 69refs
Contract DOT-HS-099-1-137
GPO \$4.75

Police training, Police traffic services, Curricula, Traffic law enforcement, Emergency services, Accident investigation, Traffic courts, Traffic control, Speed estimation, Accident diagrams, Photography, Accident report forms, Accident records, Traffic law violators, Alcohol chemical tests, Alcohol breath tests, Alcohol blood tests, Urinalysis, Drinking drivers, Arrest procedures, Traffic surveillance, Police motorist contacts, Traffic laws, Accident causes, Evidence, Instruction materials

Lesson plans constituting the classroom and field training phases of this training program are presented. Each lesson plan specifies the relevant training objectives, instructor references, suggested training aids, and an outline of content to be covered and/or procedures to be followed for the unit of instruction. The lessons cover traffic law and traffic law enforcement, traffic direction and control, accident management, preparation for traffic court, and services for motorists.

HS-800 719

2I. Traffic Control

MEASURES OF THE LATERAL PLACEMENT OF PASSENGER CARS AND OTHER VEHICLES IN**PROXIMITY TO INTERCITY BUSES ON 2 LANE AND MULTILANE HIGHWAYS. FINAL REPORT**

Systems Technology, Inc., Hawthorne, Calif.
D. H. Weir, C. S. Sihilling 1972 65p 8refs Rept. No.
STI-TR-1016-2, PB-220 092
Contract FH-11-7570
Report for Jul 1971-Oct 1972.
NTIS

Lateral vehicle spacing, Vehicle positioning, Vehicle vehicle interface, Bus design, Passing, Overtaking, Vehicle trajectories, Speed, Vehicle width, Highway characteristics, Crosswind, Photographic equipment, Data acquisition, Aerodynamics, Data reduction, Data processing, Data analysis, Histograms, Statistical analysis, Two lane roads, Four lane highways, Six lane highways, Eight lane highways, Rural highways

Lateral placement measures on the highway are presented for MC-6 and MC-7 intercity buses, and for adjacent vehicles overtaking and passing the bus. The test conditions were mainly two lane and multilane highways in rural flat terrain. Both no-wind and crosswind conditions were studied, lanes were 12 and 13 ft. wide, and bus speed was typically 50-55 mph. The basic data were obtained with synchronized cameras, mounted inside the bus windows. The data were reduced to obtain car-bus relative speed, car speed, bus trajectory in lane, car trajectory relative to bus, and car trajectory relative to lane; for about 1100 passing encounters. The data showed no difference in adjacent vehicle placement between MC-6 and MC-7 buses, for given conditions. When in the lane next to the bus on a multilane highway, the mean lateral placement of the adjacent vehicle was offset about 1-1.5 ft. to the left of its centerline regardless of bus type.

HS-013 556

ROAD RESEARCH 1971. ANNUAL REPORT OF THE ROAD RESEARCH LABORATORY

147P 88REFS

Her Majesty's Stationery Office

Road Res. Lab., Annual reports, Transportation planning, Urban transportation, Traffic research, Transportation studies, Traffic management, Traffic control, Highway safety, Accident analysis, Vehicle safety, Driver behavior research, Pedestrian behavior, Driver aid systems, Highway design, Pavements, Safety programs, Safety research, Accident investigation, Transportation systems, Bridge design, Environmental factors, Highway environmental impact, Tunnel design, Salt effects, Highway construction, Road materials, Highway planning, Public transportation, Highway transportation, Traffic engineering, Highway engineering, Economic analysis, Traffic noise, Child safety, Speed volume relationships

In highway engineering the Laboratory is concerned with the planning, design, construction, and maintenance of roads and highway structures, particularly bridges and tunnels. In traffic engineering and safety the aim is to develop improved methods for the safe, efficient, and convenient movement of people and goods. In transportation research the Laboratory is involved in examining transport operations and their interactions with industrial, commercial, residential, and recreational activities. Selected highlights of work in progress, including automated public transport; economic assessment of alternative policies for traffic restraint; traffic noise; channel tunnel ferry wagons; speed/flow relations on suburban main roads; child safety; car

safety program; road salting and vehicle corrosion; rural hydrology; and accelerated methods of testing concrete are presented. Current research, in progress or completed, conducted by the transportation, traffic safety, design, construction, central services, and administration divisions is summarized.

HS-013 560

EFFECTS OF MARKER TYPE, VIEWING ANGLE, AND VEHICLE VELOCITY ON PERCEPTION OF TRAFFIC MARKERS IN A DYNAMIC VIEWING SITUATION

C. J. Ladan, T. M. Nelson 1973 5refs
Human Factors v15 n1 p9-16 (1973)

Stop signs, Sign visibility, Visual perception, Sign recognition, Sign design: Sign shape, Variance analysis, Speed, Sign tests, Sign effectiveness

The effects of two types of stop signs, nine angles of orientation, four vehicle velocities, and their interactions were studied in a dynamic traffic situation. Because stop signs are seen in constant transformation in actual driving situations, the experiment studied dynamic conditions in the laboratory by variation of the mentioned factors in short film clips. Thirty subjects responded to each clip in one of three possible categories: stop, not stop, and not seen. Responses of the first two types were then categorized as either correct or in error, based on stimulus orientation. An analysis of variance proved the factors of sign type, viewing angle, and their interaction to be statistically significant, while the factor of vehicle velocity and other interactions proved not significant. More correct responses were produced by the curved sign than by the two dimensional sign at most angles of orientation and at all vehicle velocities.

HS-013 561

AN EXPERIMENT ON CAR SIZE EFFECTS IN TRAFFIC

Traffic Engineering and Control v15 n2 p90-2, 99 (Jun 1973)
R. Herman, T. Lam, R. Rothery 1973 10refs
Traffic Engineering and Control v15 n2 p90-2, 99 (Jun 1973)

Automobile dimensions, Platoons, Queueing, Vehicle spacing, Traffic flow, Travel time, Test tracks, Steady state, Car following, Traffic capacity, Compact automobiles, Driver behavior, Proving ground tests

Using platoons formed of 10 Chevrolet Impalas representing standard-size cars and 10 Vegas representing small cars, single-lane traffic characteristics of the two vehicle types were compared. The experiments, which were carried out on two test tracks, indicate that small cars could influence the characteristics of urban traffic. However, the effects that can be directly attributed to vehicle length are small. The transient characteristics of platoons starting up from rest and accelerating to a specific cruising speed were studied as an approximation to the behavior of a queue of cars leaving a signalized intersection. Following drivers in small cars exhibited faster starting response times. In steady state spacing experiments the average platoon length of the small car platoon was shorter than the average platoon length of the standard-size car platoon for speeds ranging from 10-60 mph due to smaller average vehicle spacing in the small car platoon.

HS-013 596

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 1. COURSE GUIDE

Dunlap and Associates, Inc., Darien, Conn.
For primary bibliographic entry see Fld. 2H.
HS-800 718

POLICE TRAFFIC SERVICES BASIC TRAINING PROGRAM. VOL. 2. INSTRUCTOR'S LESSON PLANS

Dunlap and Associates, Inc., Darien, Conn.
For primary bibliographic entry see Fld. 2H.
HS-800 719

FEASIBILITY STUDY OF CLOSED CIRCUIT TELEVISION FOR TRAFFIC SURVEILLANCE

California Dept. of Public Works, Sacramento
For primary bibliographic entry see Fld. 2B.
HS-845 016

2K. Traffic Records

INTEGRATED TRAFFIC RECORDS SYSTEM. FINAL REPORT

La Mesa Public Works Dept., Calif.
C. R. Bras 1972 36p
Sponsored by California Office of Traf. Safety, National Hwy. Traf. Safety Administration, and Federal Hwy. Administration.
NTIS

Traffic records, Computerized records management, Automated accident records, Accident report forms, Accident location, Flow charts, Coding systems, La Mesa

The conversion of a manual system of traffic collision records to computer readable data files is described. Three master files were developed: collision master file, intersection master file, and road register master file. The data are processed through San Diego County's computerized traffic accident information system. The system provides more information than was possible through the manual method thus enabling the staff to provide a higher level of service in identification and more surveillance of high accident locations, traffic control devices, and police personnel assignment.

HS-845 017

MODIFICATIONS TO TRAFFIC RECORDS SYSTEM. FINAL REPORT

69P
Prepared for Sunnyvale Director of Public Safety. Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Traffic records, Automated accident records, Computerized records management, Accident report forms, Coding systems, Computer programs, Sunnyvale

The conversion of the Sunnyvale traffic records system to permit use of the standard Traffic Collision Report form is described. A new computer program, incorporating new selective capability, was written to produce more detailed management and statistical reports. A user's guide is included which provides transactions used to enter data, data specification tables, report codes, transaction codes, report form, and the report program.

HS-845 018

Field 2—HIGHWAY SAFETY

HSL 73, No. 24

Group 2K—Traffic Records

AUTOMATED TRAFFIC RECORDS SYSTEM. FINAL REPORT

78P

Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Automated accident records, Traffic records, Computerized records management, Accident report forms, Flow charts, Accident location, Information system design, California

The traffic record system is comprised of three subsystems designed to collect statistical information about street and highway intersections and non-intersections, accidents, and citations. The traffic data will be used to create reports for traffic engineering, police traffic bureau and police management. The three subsystems are described and sample input forms and output reports are provided. System flow charts are also included. At the first implementation stages the Traffic Engineering Department indicated a large savings in field research. The City Traffic Engineer has saved approximately 10 working hours each week by using the system reports.

HS-845 023

POMONA VALLEY REGIONAL TRAFFIC RECORDS PROJECT. FINAL REPORT

125P

Sponsored by California Office of Traf. Safety and National Hwy. Traf. Safety Administration. Prepared in cooperation with Young (Arthur) and Co.
NTIS

Traffic records, Computerized records management, Automated accident records, Intergovernmental relations, Systems analysis, Flow charts, Data acquisition, Data processing, Information system design, Information retrieval, Coding systems, Program evaluation, California, Pomona

The development of a multi-city automated traffic records system is described. Although the project started with seven cities and ended with three, a common system for multiple cities is considered feasible. Findings indicate, however, that cities below 20,000 population would not benefit from automated systems. The requirements analysis, design criteria, and processing flow are presented. Sample input forms and output reports are given. System flow charts are included.

HS-845 025

3. HUMAN FACTORS

3A. Alcohol

LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOL. 2--INSTRUMENT SCREENING EXPERIMENTS. FINAL REPORT

Harvard School of Public Health, Boston, Mass.
R. A. McFarland, J. D. Dougherty, E. A. Arees, J. J. Gird 1973 207p 4refs
Contract DOT-TSC-213-1
Report for Aug 1971-Oct 1972. Vol. 1 is HS-800 925; Vol. 3 is HS-800 927.
NTIS

Alcohol detection and interlock systems, Driver intoxication, Driver performance, Alcohol effects, Test volunteers, Blood al-

cohol levels, Design of experiments, Alcohol breath tests, Sex factors, Variance analysis, Social drinking, Tracking, Degrees of freedom, Performance tests, Intelligence, Driver records, Age factors, Driver psychological tests, Driver physical examinations

Laboratory tests of eight alcohol detection and interlock systems were conducted. Performance was measured at 0.0% blood alcohol levels (BAL) and at three exposure levels planned so that BAL would peak above 0.09%. Major goals were to determine the relative effectiveness of the devices when operated by social and problem drinkers, to measure correlations between performance and BAL, and to determine inter subject and intra subject variability at various BAL's. Subjects were trained and tested, and the eight devices were comparatively tested. The final devices to be tested were the QuickKey, Phystester, Complex Reaction Tester, and the Compensatory Tracking. While all devices showed a larger percentage of failures at high alcohol levels, the QuickKey device appeared to be the most effective. Subjects on this device failed 43.5% of the time at the highest BAL and failed only 4.2% of the time at the lowest BAL.

HS-800 926

LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOL.

3--INSTRUMENT PERFORMANCE AT HIGH BAL. FINAL REPORT

Dunlap and Associates, Darien, Conn.

J. F. Oates, Jr., R. T. McCay 1973 123p refs

Contract DOT-TSC-251-4

Report for Aug 1971-Oct 1972. Vol. 1 is HS-800 925; Vol. 2 is HS-800 926.

NTIS

Alcohol detection and interlock systems, Driver intoxication, Blood alcohol levels, Alcohol effects, Performance tests, Driver performance, Test volunteers, Driver physical examinations, Alcohol breath tests, Sex factors, Age factors, Questionnaires

Interlock performance is equated with the proportion of drivers that a device would reject at various blood alcohol concentrations (BAC). Experimental objectives are derived from the goal of determining performance across a wide range of BAC's. Procedures used to satisfy the objectives are described in detail. Detailed descriptions of each of the five tested interlocks are presented: Complex Reaction Tester, Phystester, QuickKey, Reaction Analyzer, and Nartron. Tabulations of performance as a function of BAC are presented for each device except Nartron. Conclusions and recommendations specific to each candidate system are given.

HS-800 927

3B. Anthropomorphic Data

HUMAN IMPACT RESPONSE, MEASUREMENT AND SIMULATION. SYMPOSIUM PROCEEDINGS, WARREN, MICHIGAN, OCTOBER 2-3, 1972

BY Plenum Press, New York

General Motors Res. Labs., Warren, Mich.

W. F. King, ed., H. J. Mertz, ed. 1973 406p refs

Includes HS-013 580--HS-013 593.

Plenum Press, New York

Human body impact tolerances, Human body simulation, Acceleration response, Biokinematic models, Human acceleration tolerances, Injury research, Human body kinematics, Biomechanics, Anthropomorphic dummy design, Head forms, Mathematical models, Mechanical neck design, Test reproducibility, Instrumentation, Test volunteers, Cadavers in testing, Anthropometry, Accident simulation, Animal experiments, Biodynamics

Topics covered at the symposium included the current state of the art of biomechanics and human simulation, impact response and appraisal criteria for the head, neck, and chest, plus human body kinematic and mobility aspects. Specific simulations to obtain biomechanically correct performance were presented and discussed.

HS-013 579

COMPARISON OF DYNAMIC RESPONSE OF HUMANS AND TEST DEVICES (DUMMIES)

Wayne State Univ., Detroit, Mich.

L. M. Patrick 1973 10refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p17-34

Crash response forecasting, Acceleration response, Anthropomorphic dummies, Test volunteers, Cadavers in testing, Occupant kinematics, Accident simulation, Biodynamics, Biomechanics, Impact forces, Human body simulation, Torque, Deflection, Injury research, Acceleration, Human body mechanical impedance, Measuring instruments, Transducers, Accelerometers, Potentiometers, High speed photography, Secondary collisions

Problems involved in comparing humans and dummy dynamic responses are discussed. Instrumentation required for measuring impact response on human volunteers, cadavers and anthropomorphic dummies is described; and some studies in which human volunteers, cadavers, and dummies were evaluated under identical impact conditions are summarized. It is concluded the rapid changes taking place in dummy design make comparisons of dynamic response of the dummy and human of limited value; current dummies often show short duration, high amplitude acceleration or force peaks on the transducer records during impact that are not present in comparable human exposures; more complete instrumentation is required to compare the human and dummy response; and gross comparison of dynamic response of current dummies with humans as obtained from high speed film analysis shows better agreement than obtained by comparing transducer results during short duration impacts. Research programs needed to improve dummy design to make the response more human-like are identified.

HS-013 581

THE REPEATABILITY OF DUMMY PERFORMANCE

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.

H. T. McAdams 1973

Contract DOT-HS-053-1-129

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p35-67

Anthropomorphic dummies, Test reproducibility, Instrument sensitivity, Test equipment, Acceleration response, Impact tests, Data analysis, Restraint systems, Performance characteristics, Statistical analysis, Acceleration pulses, Time factors, Variance analysis, Performance tests, Head acceleration tolerances, Chest acceleration tolerances, Loads (forces), Femurs

Efforts to measure performance differences attributable to test-to-test variability of a particular dummy, dummy-to-dummy variability of dummies of the same manufacture, and variability from one make of dummy to another are described. Comparisons were conducted under a number of restraint conditions. Two Sierra and two Alderson dummies were subjected to three replicate tests. For each run, head and chest accelerations and femur loads were recorded as functions of time. Data analysis procedures for processing the results are discussed. It was concluded that lack of repeatability of dummy response when subjected to supposedly identical conditions can arise because of either a difference in the dummies' response characteristics or differences in the test environment. It was also concluded that sensitivity, as well as repeatability, must be considered in judging the efficacy of a dummy for safety compliance testing.

HS-013 582

DUMMY PERFORMANCE IN CRASH SIMULATION ENVIRONMENTS

National Hwy. Traf. Safety Administration, Washington, D.C.

A. M. Thomas 1973 4refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p69-82

Anthropomorphic dummies, Performance characteristics, Accident simulation, Test reproducibility, Deceleration, Calibration, Acceleration response, Acceleration pulses, Data reduction, Webbing, Test equipment, Belts, Impact sleds, Data acquisition

A test procedure is presented whereby dummies can be subjected to a controlled and reproducible environment which is independent of the sled facility used. A set of straps with slack in them couple the sled to the dummy. The straps decelerate the dummy in a specific fashion independent of the shape of the sled deceleration time pulse. Results of measurements on four dummies are presented. Both side facing and forward impacts were simulated, each at two different energy levels. Maximum accelerations were about 50 g's in the head and about 40 g's in the chest. The standard deviation of 10 runs for both head and chest measurements averaged about 6%. A procedure is described whereby a calibration number can be assigned to individual dummies so that results obtained in compliance testing can be more uniform.

HS-013 583

A BASIS FOR CRASH DUMMY SKULL AND HEAD GEOMETRY

General Motors Res. Labs., Warren, Mich.

R. P. Hubbard, D. G. McLeod 1973 6refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p129-52

Human body simulation, Head forms, Skull, Anthropometry, Anatomy, Soft tissues, Synthetic skin, Anthropomorphic dummy design, Human body segment parameters

As an essential step toward improving the repeatability and reproducibility of crash dummy head response to impact events, the geometric configuration of dummy heads must be more completely defined. If these dummy heads are to be used for assessment of human head injury hazard, then their geometric characteristics should be based on human anthropometry. The location of skull landmarks and the construction and configuration of a skull geometry model are documented in this report. A second model was constructed which represents the ex-

Group 3B—Anthropomorphic Data

ternal configuration of the human head and not only agrees with head dimensions from a large number of subjects but also correctly locates the features of the human head—anatomically correct headform coordinate axes, head-neck articulation, cranial contours, and facial structure. In using the information presented here, it is important to realize that duplication of human structural geometry in dummy head design is not sufficient to insure similarity of human and dummy responses.
HS-013 585

ANALYSIS OF A SLANTED-RIB MODEL OF THE HUMAN THORAX

K. Foster 1973

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p165-77

Human body simulation, Rib cage, Anthropomorphic dummy design, Mathematical analysis, Deflection, Nonlinear systems, Impact forces, Stiffness, Rotation, Bending, Torsion, Equations, Viscoelasticity, Shear modulus, Static tests

The applicability of a slanted-rib thorax for human thorax simulation is examined. It is shown that the slanted-rib configuration, because of shearing induced in intercostal material, can produce the damping and nonlinear stiffness that are observed in the human thorax. A method of analysis is developed for evaluating the force-deflection characteristics. Rib rotation, bending, and torsion are taken into account in calculating deflections. Numerical results are examined to illustrate the effects of various parameters. Loading-rate sensitivity observed during testing is attributed to the viscoelastic properties of the intercostal material.

HS-013 586

EVALUATION OF DUMMY NECK PERFORMANCE

Michigan Univ., Ann Arbor

J. W. Melvin, J. H. McElhaney, V. L. Roberts 1973 17refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p247-61

Human body simulation, Mechanical neck design, Performance characteristics, Biomechanics, Biodynamics, Head motion range, Head movement, Human body mechanical impedance, Flexion, Extension, Cervical spine, Reviews, Neck motion range, Acceleration response, Test volunteers, Cadavers in testing, Equations, Dynamic tests, Angular acceleration, X rays

The literature on cervical spine mechanics, including recent X ray studies on cervical spine mobility in human volunteers and human volunteer sled tests is reviewed and summarized with respect to human head-neck response to dynamic loading. The mechanics of the head-neck system is discussed; factors influencing dummy neck design are indicated; and the results of a program to develop an improved neck simulation are presented. Dummy neck simulation performance can be evaluated by comparison of the existing human volunteer test data with neck simulation test data obtained under similar test conditions. The criteria used to evaluate the performance are the range of angular motion of the head relative to the torso; the trajectory of the center of gravity of the head relative to the torso; and the resistance of the neck to motion of the head during loading and rebound.

HS-013 588

PROGRESS IN THE MECHANICAL SIMULATION OF HUMAN HEAD-NECK RESPONSE

Department of Transp., Washington, D.C.

M. P. Haffner, G. B. Cohen 1973 20refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p289-320

Mechanical neck design, Human body simulation, Acceleration response, Biokinematic models, Mathematical models, Human body kinetics, Human body kinematics, Neck motion range, Head motion range, Head movement, Loading (mechanical), Dynamic tests, Static tests, Performance tests, Flexion, Extension, Computerized simulation, Rotation, Torque, Muscular forces, Test volunteers, Cadavers in testing, Anthropomorphic dummies, Angular velocity, Displacement

A mechanical neck which simulates human head motion in the automotive crash environment is described. The present design simulates head motion in the sagittal plane by means of a two pivot model. Pre-loading torques, as well as linear and nonlinear torque elements, can be accommodated at each pivot location. The proposed method of validation is the matching of displacement-velocity response of the head as predicted by a two degree-of-freedom computer simulation with existing human data. Simulations have been performed using Daisy sled volunteer data; comparisons of head angular displacements and angular velocities show favorable correlation.

HS-013 589

PRELIMINARY DISCUSSION OF AN APPROACH TO MODELING LIVING HUMAN HEAD AND NECK TO -G SUB X IMPACT ACCELERATION

Naval Aerospace Medical Res. Lab., Pensacola, Fla.

E. B. Becker 1973 4refs

Sponsored by U. S. Navy Bureau of Medicine and Surgery and Office of Naval Res.

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p321-9

Acceleration response, Head acceleration tolerances, Neck impact tolerances, Biokinematic models, Head movement, Neck motion range, Biodynamics, Human body kinematics, High speed photography, Vertebrae, Test volunteers, Angular acceleration, Angular velocity, Displacement

A number of volunteer subjects underwent impact acceleration. The motion of the subject's head and neck in the midsagittal plane was monitored with inertial instrumentation and high speed photography. These collected data are being studied and it is hoped that this study will eventually yield a limited set of parameters quantifying the transformation of motions sustained at the subject's T1 vertebra during impact acceleration to subsequent motion of the head; correlations between these sets of parameters and more easily measured anthropometric quantities; and a mechanical analog of the human head and neck embodying these sets of parameters. High speed films of the impact experiments were reviewed and a mechanical linkage was selected as a context for the analysis. Preliminary results indicate that the response of the mechanical linkage to T1 inputs are in good agreement with the subjects' own dynamic response in terms of angular displacement, velocity, and acceleration.

HS-013 590

NEW ADVANCES IN VOLITIONAL HUMAN MOBILITY SIMULATION

Michigan Univ., Ann Arbor

D. B. Chaffin, R. G. Snyder 1973 8refs

Much of the research reported was developed under Contract AMRL-TR-71-88. Mobility data used for the model was formulated under Contract F-33615-70-1777.

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p333-44

Biokinematic models, Computerized simulation, Human body simulation, Motion, Anthropometry, Human factors engineering, Ergosphere, Occupant positioning, Plotters, Cathode ray tubes

The results of research conducted to quantify the configurations of the human body most often chosen by people when reaching with one hand about their immediate environment are discussed. In performing this research basic size and volitional mobility data of the human torso were developed. These data have been used in constructing a computerized kinematic model, the output of which is a linkage representation of the body which is either displayed on a cathode ray tube or drawn by a computer plotter. With this type of model a designer can begin to develop future dummies that better represent the size and mobility of various body segments. In addition, the effects of various gross anthropometric variations on volitional body configurations and specific segment dimensions can be predicted for occupant packaging design evaluations.

HS-013 591

VALIDATION OF A THREE-DIMENSIONAL MATHEMATICAL MODEL OF THE CRASH VICTIM

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.

J. A. Bartz 1973 10refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p345-79

Mathematical models, Computerized simulation, Occupant modeling, Validation, Crash response forecasting, Anthropometric dummies, Measurement, Human body simulation, Acceleration response, Occupant kinematics, Measuring instruments, Accident simulation, Computer programs, Biodynamics, Center of gravity, Mass, Moments of inertia, Weight, Joint motion range, Torque, Flexion, Deflection, Torsion, Force, Coefficient of friction, Impact tests, Air bag restraint systems, Static tests, Drop tests, Human body segment parameters

A detailed series of static measurements on an anthropometric dummy, plus a series of experiments ranging from static bench tests to impact sled tests and a full-scale automobile crash, were used to test the validity of a 40 degrees of freedom, three dimensional mathematical model of a crash victim. Inputs to the digital computer program were based on measurements of dummy characteristics, including segment weights, segment moments of inertia, contact surface and link dimensions, and joint torque characteristics, as well as material properties of the contact surfaces obtained from static load-deflection measurements. Predictions of the computer simulation using the measured inputs are compared with experimental results. It is concluded that the generality and detail incorporated in the computer model, coupled with the demonstrated good prediction accuracy and relatively low computation cost, make it a valuable engineering tool for application in continuing research efforts.

HS-013 592

KINEMATIC ANALYSIS OF HUMAN VOLUNTEER TESTS

Michigan Univ., Ann Arbor

V. L. Roberts, D. H. Robbins 1973 2refs

In HS-013 579, Human Impact Response, Measurement and Simulation, New York, 1973 p381-94

Acceleration response, Test volunteers, Dynamic tests, Head motion range, Head movement, Human body kinematics, Acceleration, Velocity, Moments of inertia, Human body segment weight, High speed photography, Data processing, Data analysis, Anthropometry, Displacement, Rotation, Angular velocity, Angular acceleration

One of the primary difficulties in providing adequate simulation of human response during a crash has been the lack of data describing human response under similar circumstances. Results of an analysis of high speed cinephotographic and electronic transducer records from a series of impact tests conducted on 6 human volunteers are presented. The tests were conducted with sled pulse G-levels of 8, 12 and 15G's. The volunteers were restrained by lap belts. Linear and angular displacement, velocity, and acceleration data for the volunteers' heads are given and provide useful information regarding human head-neck response to impact.

HS-013 593

3C. Cyclists

TEMPLE CITY PEDESTRIAN-BICYCLE SAFETY EDUCATION AND ENFORCEMENT PROJECT. FINAL REPORT

43P

California Office of Traf. Safety and National Hwy. Traf. Safety Administration.

NTIS

Pedestrian safety, Bicycle safety, Child safety education, Pedestrian education, Safety programs, Traffic law enforcement, Temple City, Traffic law violations, Safety program effectiveness, Accident records, Accident prevention, School safety patrols, Program evaluation

A survey found no structured bicycle and pedestrian safety curriculum in the Temple City Unified School District. The educational and enforcement program developed to remedy this situation is described and evaluated. As a direct result of the program, Temple City now meets the following standards: an effective training and education program designed and implemented for pedestrians and bicyclists in the kindergarten to sixth grade age group; more extensive protection for the child pedestrian; full utilization of the 'Safest Route to School' program; parent-teacher groups encouraged to promote the safety of school children; enforcement of pedestrian and bicycle regulations at high hazard locations; a Community Traffic Safety Officer; a student safety patrol; and an accident reporting and recording procedure for the continuing measurement of the pedestrian injury problem and the extent to which specific countermeasures are associated with changes in pedestrian injuries and deaths.

HS-845 022

3D. Driver Behavior

CLUES THAT HELP SPOT MEDICALLY IMPAIRED DRIVERS

For primary bibliographic entry see Fld. 3E.

HS-013 553

THE HSRI PART-TASK DRIVING SIMULATOR FOR RESEARCH IN VEHICLE REAR LIGHTING AND RELATED STUDIES

Michigan Univ., Ann Arbor. Hwy. Safety Res. Inst.
J. D. Campbell, R. G. Mortimer 1972 76p 4refs Rept. No.
UM-HSRI-HF-72-12, PB-218 439
Contract UM-7101-C128
NTIS

Driving simulators, Driving simulation, Vehicle lighting, Car following, Rear lamps, Computerized simulation, Digital computers, Servomechanisms, Driver reaction time, Driver monitoring, Headways, Monocular vision, Display systems, Turn signals, Colored lamps, Variance analysis, Stop lamps, Night driving, Driver behavior

A straight, two lane road with a lead vehicle in the lane being driven was simulated. The test subject has accelerator and brake controls only; steering is not provided. Car following tasks or overtaking without passing can be simulated in day or night driving conditions. Approximations to rear vehicle acceleration and braking dynamics are used. Scaling and control of lamp intensity and color is achieved with flexibility in varying rear lighting system display and operational characteristics. Lead car speed and signaling can be controlled manually or by magnetic tape records. The latter reproduces the speed-time history and signal actuations from a real vehicle under the highway and traffic conditions existing when the recordings were made. A digital computer interface provides system control, storage of rear lighting systems, and real time data acquisition and analysis.

HS-013 555

AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE EFFECT OF BUS-INDUCED AERODYNAMIC DISTURBANCES ON ADJACENT VEHICLE CONTROL AND PERFORMANCE

Systems Technology, Inc., Hawthorne, Calif.

For primary bibliographic entry see Fld. 5R.

HS-013 557

ROAD RESEARCH 1971. ANNUAL REPORT OF THE ROAD RESEARCH LABORATORY 147P 88REFS

Her Majesty's Stationery Office

Road Res. Lab., Annual reports, Transportation planning, Urban transportation, Traffic research, Transportation studies, Traffic management, Traffic control, Highway safety, Accident analysis, Vehicle safety, Driver behavior research, Pedestrian behavior, Driver aid systems, Highway design, Pavements, Safety programs, Safety research, Accident investigation, Transportation systems, Bridge design, Environmental factors, Highway environmental impact, Tunnel design, Salt effects, Highway construction, Road materials, Highway planning, Public transportation, Highway transportation, Traffic engineering, Highway engineering, Economic analysis, Traffic noise, Child safety, Speed volume relationships

In highway engineering the Laboratory is concerned with the planning, design, construction, and maintenance of roads and highway structures, particularly bridges and tunnels. In traffic engineering and safety the aim is to develop improved methods for the safe, efficient, and convenient movement of people and

goods. In transportation research the Laboratory is involved in examining transport operations and their interactions with industrial, commercial, residential, and recreational activities. Selected highlights of work in progress, including automated public transport; economic assessment of alternative policies for traffic restraint; traffic noise; channel tunnel ferry wagons; speed/flow relations on suburban main roads; child safety; car safety program; road salting and vehicle corrosion; rural hydrology; and accelerated methods of testing concrete are presented. Current research, in progress or completed, conducted by the transportation, traffic safety, design, construction, central services, and administration divisions is summarized.

HS-013 560

AN EXPERIMENT ON CAR SIZE EFFECTS IN TRAFFIC

For primary bibliographic entry see Fld. 2I.

HS-013 596

CLASSIFICATIONS OF DRIVING EXPOSURE AND ACCIDENT RATES FOR HIGHWAY SAFETY ANALYSIS

Accident Analysis and Prevention v5 p81-94 (1973)

P. S. Carroll 1973 14refs

Accident Analysis and Prevention v5 p81-94 (1973)

Accident risk forecasting, Driver mileage, Accident rates, Driver sex, Driver age, Age factor in accidents, Sex factor in accidents, Data analysis, Vehicle characteristics

A pilot survey of driver exposure was conducted, based on a random national sample of 7145 licensed drivers. Data was analyzed using the Automatic Interaction Detector (AID) algorithm, and hierarchies were produced of best predictors of accidents, exposure, and accident rate. The best predictor of exposure was whether or not a person drives on the job. When variables are limited to those appearing on accident reports, driver sex and type of vehicle were the best predictors, followed by percent driving on streets, model year of vehicle, and driver age. The best predictor of accidents was driver age, followed by driver sex and other variables in different order than the exposure hierarchy.

HS-013 597

THE CONCEPT OF EXPOSURE

For primary bibliographic entry see Fld. 1C.

HS-013 598

INDUCED EXPOSURE

For primary bibliographic entry see Fld. 1C.

HS-013 599

A PILOT STUDY OF OBSERVED AND INDUCED EXPOSURE TO TRAFFIC ACCIDENTS

For primary bibliographic entry see Fld. 1C.

HS-013 600

A MODEL FOR ESTIMATION OF COLLECTIVE EXPOSURE AND PRONENESS FROM ACCIDENT DATA

For primary bibliographic entry see Fld. 4G.

HS-013 601

LEARNING TO DRIVE: SKILLS, CONCEPTS, AND STRATEGIES

Columbia Univ., New York
For primary bibliographic entry see Fld. 3E.
HS-013 603

LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOL. 2--INSTRUMENT SCREENING EXPERIMENTS. FINAL REPORT

Harvard School of Public Health, Boston, Mass.
For primary bibliographic entry see Fld. 3A.
HS-800 926

LABORATORY EVALUATION OF ALCOHOL SAFETY INTERLOCK SYSTEMS, VOL. 3--INSTRUMENT PERFORMANCE AT HIGH BAL. FINAL REPORT

Dunlap and Associates, Darien, Conn.
For primary bibliographic entry see Fld. 3A.
HS-800 927

3E. Driver Education

CLUES THAT HELP SPOT MEDICALLY IMPAIRED DRIVERS

L. N. Hames 1973
Traffic Safety v73 n7 p8-11, 38-40 (Jul 1973)

Driver physical fitness, Driver licensing, Driver mental fitness, Driver license examiners, Medical factors, Psychological factors, Wisconsin, Cardiovascular diseases, Vision tests, Visual behavior, Epilepsy, Driver disqualification, Driver license examination, Driver behavior

A pilot program launched in Wisconsin by the American Medical Association and the American Association of Motor Vehicle Administrators, which trains lay driver license examiners to recognize signs and symptoms that may indicate the presence of medical conditions that could be driving hazards, is discussed. Each of five physicians representing the specialties of cardiovascular surgery, neurological surgery, psychiatry, ophthalmology, and general medicine presented a one-hour seminar to a group of field examiners, and then repeated it before supervisory personnel. It was strongly emphasized that examiners are not being trained to be medical diagnosticians but only to become more aware of hints of a serious limitation to driving and to send drivers with such signs to a physician for medical evaluation. A package containing a video-tape of the presentations, a review manual, and a slide-film presentation on driving limitation has been prepared.
HS-013 553

LEARNING TO DRIVE: SKILLS, CONCEPTS, AND STRATEGIES

BY Addison-Wesley Publishing Co., Menlo Park, Calif.
Columbia Univ., New York
W. G. Anderson 1971 254p
Addison-Wesley Publishing Co., Menlo Park, Calif.

Driver education manuals, Curricula, Driving task analysis, Behind the wheel instruction, Tracking, Backing, Hazard perception, Lane changing, Turning, Right turns, Left turns, Night driving, Icy road conditions, Wet road conditions, Driver emergency responses, Driver vehicle familiarity, Control location,

Parking, Speed control, Acceleration, Braking, Road curves, Steering, Driver errors, Traffic laws, Passing, U turns, Signals, Sight distances, Road grades, Intersections, Traffic density, Pedestrians, Merging, Traffic control devices

This driver education manual is designed to prepare students for the experiences they will have during behind the wheel instruction. It is organized to correspond with the stages of practice driving instruction and contains information on basic skills in moving the vehicle, initial on-street driving, reduced-risk maneuvers, driving strategies, and driving emergencies. A self evaluation form and a sample plan for future improvement are included.

HS-013 603

3K. Pedestrians

CHILDREN'S USE OF AIDS TO CONSPICUITY

Transport and Road Res. Lab., Crowthorne, Berks. (England)
G. D. Lewis 1973 36p 2refs Rept. No. TRRL-LR-534
Corporate author

Child safety, Night visibility, Pedestrian safety, Child pedestrians, Protective clothing, Sex factors, Age factors, Fluorescent colors, Urban areas, Rural areas, Reflective materials, Social class, Travel modes, Parents, Instructors, Child safety education, Highway lighting, Questionnaires

The introduction of British Standard Time in 1968 led to efforts to encourage children to wear conspicuous clothing. Factors such as latitude, social class, and age and sex of child, which were thought to influence the wearing of aids to conspicuity, were studied. Primary school children, head teachers, and parents were questioned about precautions children took in wearing or carrying articles easily visible in the light of headlamps or street lighting and about whether or not adults accompanied children to school. Most people did not consider the road safety problems under British Standard Time to be serious. Children who used protective items were in the minority although most schools gave advice on the subject. Children traveling by car were less likely to use such items than those who walked to school. The use of protective items was not connected with social class or trip length but was associated with having to cross busy streets.

HS-013 550

GLENDORA PEDESTRIAN SAFETY STUDY

Glendora Engineering Dept., Calif.
W. Kanyuck 1972 47p
Sponsored by California Office of Traf. Safety.
NTIS

Pedestrian safety, Glendora, Pedestrian accidents, Accident factors, Accident statistics, Pedestrian fatalities, Pedestrian injuries, Accident prevention, Accident causes, Accident location, Safety programs, Financing, Traffic engineering, Pedestrian age, Time of accidents, Accident rates, Maps, Accident location charts, Traffic signal location, Pedestrian education, Accident analysis

Data regarding pedestrian accidents in Glendora were assembled and analyzed. All accident data were taken directly from police accident reports. The accident reports for the years 1969, 1970 and 1971 were studied. From an analysis of this data the major pedestrian accident causes and locations have been determined and recommendations have been designed to in-

crease pedestrian safety. The major findings of the study indicate a definite need for better pedestrian education programs, initiation of the Parent Safety Aide program, and continuation of installation of physical pedestrian safety improvements.
HS-845 020

TEMPLE CITY PEDESTRIAN-BICYCLE SAFETY EDUCATION AND ENFORCEMENT PROJECT. FINAL REPORT

43P

California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Pedestrian safety, Bicycle safety, Child safety education, Pedestrian education, Safety programs, Traffic law enforcement, Temple City, Traffic law violations, Safety program effectiveness, Accident records, Accident prevention, School safety patrols, Program evaluation

A survey found no structured bicycle and pedestrian safety curriculum in the Temple City Unified School District. The educational and enforcement program developed to remedy this situation is described and evaluated. As a direct result of the program, Temple City now meets the following standards: an effective training and education program designed and implemented for pedestrians and bicyclists in the kindergarten to sixth grade age group; more extensive protection for the child pedestrian; full utilization of the 'Safest Route to School' program; parent-teacher groups encouraged to promote the safety of school children; enforcement of pedestrian and bicycle regulations at high hazard locations; a Community Traffic Safety Officer; a student safety patrol; and an accident reporting and recording procedure for the continuing measurement of the pedestrian injury problem and the extent to which specific countermeasures are associated with changes in pedestrian injuries and deaths.

HS-845 022

3L. Vision

EFFECTS OF MARKER TYPE, VIEWING ANGLE, AND VEHICLE VELOCITY ON PERCEPTION OF TRAFFIC MARKERS IN A DYNAMIC VIEWING SITUATION

For primary bibliographic entry see Fld. 2I.
HS-013 561

4. OTHER SAFETY-RELATED AREAS

4A. Codes And Laws

HAZARDOUS MATERIALS IN TRANSIT

Transportation Fire Hazards, 1973 p7-15
Corporate author

Transportation of hazardous materials, Transportation regulation, Federal role, Federal laws, Hazardous materials, Accident investigation, Emergency training, Protective containers, Fire fighting, Coding systems, Warning signs, Information systems, Labeling, Fire prevention, Public information programs, Government industry cooperation

Current federal regulatory activities dealing with the control of hazardous materials are discussed and problems in identifying and treating hazards and containerization are defined. It is recommended that: more accidents involving hazardous materials in all modes of transportation be investigated to determine the cause of these accidents on a quantitative basis; a uniform placarding and labeling system, which will provide information on the hazards of chemicals, be adopted for placarding for all modes of transportation; appropriate agencies interface more with one another and the private sector in sponsoring research and development programs that will result in intermodal performance-based regulations and standard methods for testing containers based on performance criteria; appropriate federal agencies join with private organizations to organize and implement an education program directed at emergency personnel to instruct them in proper methods of handling hazardous commodities transportation incidents; and a public information program on hazardous materials be implemented.

HS-013 552

4B. Community Support

GLENDORA PEDESTRIAN SAFETY STUDY

Glendora Engineering Dept., Calif.
For primary bibliographic entry see Fld. 3K.
HS-845 020

TEMPLE CITY PEDESTRIAN-BICYCLE SAFETY EDUCATION AND ENFORCEMENT PROJECT. FINAL REPORT

43P

California Office of Traf. Safety and National Hwy. Traf. Safety Administration.
NTIS

Pedestrian safety, Bicycle safety, Child safety education, Pedestrian education, Safety programs, Traffic law enforcement, Temple City, Traffic law violations, Safety program effectiveness, Accident records, Accident prevention, School safety patrols, Program evaluation

A survey found no structured bicycle and pedestrian safety curriculum in the Temple City Unified School District. The educational and enforcement program developed to remedy this situation is described and evaluated. As a direct result of the program, Temple City now meets the following standards: an effective training and education program designed and implemented for pedestrians and bicyclists in the kindergarten to sixth grade age group; more extensive protection for the child pedestrian; full utilization of the 'Safest Route to School' program; parent-teacher groups encouraged to promote the safety of school children; enforcement of pedestrian and bicycle regulations at high hazard locations; a Community Traffic Safety Officer; a student safety patrol; and an accident reporting and recording procedure for the continuing measurement of the pedestrian injury problem and the extent to which specific countermeasures are associated with changes in pedestrian injuries and deaths.

HS-845 022

4C. Cost Effectiveness

THE VOLKSWAGEN ESV

Volkswagenwerk A.G., Wolfsburg (West Germany)
For primary bibliographic entry see Fld. 5D.

HS-013 540

**FEASIBILITY STUDY OF CLOSED CIRCUIT
TELEVISION FOR TRAFFIC SURVEILLANCE**

California Dept. of Public Works, Sacramento
For primary bibliographic entry see Fld. 2B.
HS-845 016

4E. Information Technology

**THE HSRI PART-TASK DRIVING SIMULATOR FOR
RESEARCH IN VEHICLE REAR LIGHTING AND
RELATED STUDIES**

Michigan Univ., Ann Arbor. Hwy. Safety Res. Inst.
For primary bibliographic entry see Fld. 3D.
HS-013 555

**MEASURES OF THE LATERAL PLACEMENT OF
PASSENGER CARS AND OTHER VEHICLES IN
PROXIMITY TO INTERCITY BUSES ON 2 LANE AND
MULTILANE HIGHWAYS. FINAL REPORT**

Systems Technology, Inc., Hawthorne, Calif.
For primary bibliographic entry see Fld. 2I.
HS-013 556

**AN EXPERIMENTAL AND ANALYTICAL
INVESTIGATION OF THE EFFECT OF BUS-INDUCED
AERODYNAMIC DISTURBANCES ON ADJACENT
VEHICLE CONTROL AND PERFORMANCE**

Systems Technology, Inc., Hawthorne, Calif.
For primary bibliographic entry see Fld. 5R.
HS-013 557

**INTEGRATED TRAFFIC RECORDS SYSTEM. FINAL
REPORT**

La Mesa Public Works Dept., Calif.
For primary bibliographic entry see Fld. 2K.
HS-845 017

**MODIFICATIONS TO TRAFFIC RECORDS SYSTEM.
FINAL REPORT
69P**

Prepared for Sunnyvale Director of Public Safety. Sponsored by
California Office of Traf. Safety and National Hwy. Traf. Safety
Administration.
NTIS

Traffic records, Automated accident records, Computerized
records management, Accident report forms, Coding systems,
Computer programs, Sunnyvale

The conversion of the Sunnyvale traffic records system to per-
mit use of the standard Traffic Collision Report form is
described. A new computer program, incorporating new selec-
tive capability, was written to produce more detailed manage-
ment and statistical reports. A user's guide is included which
provides transactions used to enter data, data specification ta-
bles, report codes, transaction codes, report form, and the re-
port program.
HS-845 018

**AUTOMATED TRAFFIC RECORDS SYSTEM. FINAL
REPORT
78P**

Sponsored by California Office of Traf. Safety and National
Hwy. Traf. Safety Administration.
NTIS

Automated accident records, Traffic records, Computerized
records management, Accident report forms, Flow charts, Ac-
cident location, Information system design, California

The traffic record system is comprised of three subsystems
designed to collect statistical information about street and
highway intersections and non-intersections, accidents, and
citations. The traffic data will be used to create reports for traf-
fic engineering, police traffic bureau and police management.
The three subsystems are described and sample input forms and
output reports are provided. System flow charts are also in-
cluded. At the first implementation stages the Traffic Engineer-
ing Department indicated a large savings in field research. The
City Traffic Engineer has saved approximately 10 working
hours each week by using the system reports.
HS-845 023

**AUTOMATED TRAFFIC RECORDS SYSTEM. PHASE
2. EMERGENCY MESSAGE SWITCHING. FINAL
REPORT
117P**

Grant 117211-516
Sponsored by California Office of Traf. Safety and National
Hwy. Traf. Safety Administration.
NTIS

Automatic emergency reporting systems, Police cooperation
with other agencies, Radio communication, Emergency ser-
vices, Computerized records management, Computerized
dispatching systems, Proposals, Systems analysis, Traffic
records, Economic factors, Traffic volume, Warning systems,
Information system design, Program evaluation

A model communication system, which integrates automated
traffic records and emergency resource inventories with a com-
puterized command and control system, is proposed. The
system constraints, requirements, and design concept are
described and implementation costs are given. An evaluation of
the project study by Justice Research Associates is included.
HS-845 024

**POMONA VALLEY REGIONAL TRAFFIC RECORDS
PROJECT. FINAL REPORT
125P**

Sponsored by California Office of Traf. Safety and National
Hwy. Traf. Safety Administration. Prepared in cooperation with
Young (Arthur) and Co.
NTIS

Traffic records, Computerized records management, Auto-
mated accident records, Intergovernmental relations, Systems
analysis, Flow charts, Data acquisition, Data processing, Infor-
mation system design, Information retrieval, Coding systems,
Program evaluation, California, Pomona

The development of a multi-city automated traffic records
system is described. Although the project started with seven ci-
ties and ended with three, a common system for multiple cities

is considered feasible. Findings indicate, however, that cities below 20,000 population would not benefit from automated systems. The requirements analysis, design criteria, and processing flow are presented. Sample input forms and output reports are given. System flow charts are included.
HS-845 025

4G. Mathematical Sciences

PERFORMANCE CRITERIA IN THE DESIGN OF AUTOMOBILE RADARS

General Motors Res. Labs., Warren, Mich.
For primary bibliographic entry see Fld. 5D.
HS-013 554

AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE EFFECT OF BUS-INDUCED AERODYNAMIC DISTURBANCES ON ADJACENT VEHICLE CONTROL AND PERFORMANCE

Systems Technology, Inc., Hawthorne, Calif.
For primary bibliographic entry see Fld. 5R.
HS-013 557

TUNING TECHNIQUES FOR CONTROLLING HEAVY-DUTY TRUCK SHAKE--VERTICAL, TORSIONAL, AND LATERAL

Isuzu Motors Ltd., Tokyo (Japan)
For primary bibliographic entry see Fld. 5K.
HS-013 577

ECONOMIC IMPACT OF MASS PRODUCTION OF ALTERNATIVE LOW EMISSIONS AUTOMOTIVE POWER SYSTEMS

International Res. and Technology Corp., Washington, D.C.
For primary bibliographic entry see Fld. 5F.
HS-013 578

HUMAN IMPACT RESPONSE, MEASUREMENT AND SIMULATION. SYMPOSIUM PROCEEDINGS, WARREN, MICHIGAN, OCTOBER 2-3, 1972

General Motors Res. Labs., Warren, Mich.
For primary bibliographic entry see Fld. 3B.
HS-013 579

ANALYSIS OF A SLANTED-RIB MODEL OF THE HUMAN THORAX

For primary bibliographic entry see Fld. 3B.
HS-013 586

PROGRESS IN THE MECHANICAL SIMULATION OF HUMAN HEAD-NECK RESPONSE

Department of Transp., Washington, D.C.
For primary bibliographic entry see Fld. 3B.
HS-013 589

VALIDATION OF A THREE-DIMENSIONAL MATHEMATICAL MODEL OF THE CRASH VICTIM

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
For primary bibliographic entry see Fld. 3B.
HS-013 592

INDUCED EXPOSURE

For primary bibliographic entry see Fld. 1C.
HS-013 599

A PILOT STUDY OF OBSERVED AND INDUCED EXPOSURE TO TRAFFIC ACCIDENTS

For primary bibliographic entry see Fld. 1C.
HS-013 600

A MODEL FOR ESTIMATION OF COLLECTIVE EXPOSURE AND PRONENESS FROM ACCIDENT DATA

Accident Analysis and Prevention v5 p157-73 (1973)
M. J. Koornstra 1973 14refs
Accident Analysis and Prevention v5 p157-73 (1973)

Accident risk forecasting, Accident proneness, Probability theory, Driver behavior, Poisson density functions, Driver experience, Least squares method, Chi square test, Variance analysis, Accident statistics, Statistical analysis, Mathematical analysis, Eigenvalues

An axiomatic probabilistic model for the analysis of accident data between classes of drivers in terms of parameters for proneness and exposure of these classes is developed. Statistical goodness of fit criteria and numerical solutions for optimal estimation of the parameters are given.

HS-013 601

EMPIRICAL RESULTS ON THE EXPOSURE-PRONENESS MODEL

For primary bibliographic entry see Fld. 1C.
HS-013 602

4H. Transportation Systems

TRANSPORTATION SYSTEMS CENTER--A SPECIAL BRIEFING. PROCEEDINGS, CAMBRIDGE, MASSACHUSETTS, OCTOBER 30-31, 1972

Department of Transp., Cambridge, Mass. Transp. Systems Center
W. C. Dunlap, ed. 1973 125p
GPO

Transportation planning, Urban transportation, Rail transportation, Public transportation, High speed ground transportation, Railroad grade crossings, Federal role, Rapid transit systems, Environmental impact statements, Air pollution, Transportation noise, Acoustic measurement, Automatic transportation systems, Aerial transit systems, Automation, Transportation networks, Automatic traffic control, Vehicle dynamics, Guideway systems, Sensors, Alcohol usage deterrents, Aircraft safety, Safety research, Air traffic control, Radar, Communication systems

A broad view of the nature of the Transportation Systems Center, its staff capabilities, and its programs for fiscal years 1971, 1972, and 1973 are presented for those who furnish goods and services to the Center. Topics covered include the development of urban transportation systems, including aerial, high speed ground, and rail systems; the environmental impact of transportation systems; automation technology; vehicle dynamics, guideway systems, and electric power systems; vehicle security and safety; transportation planning; the Department of

Transportation's air program; air traffic control; and Transportation System Center procurement procedures.
HS-013 559

ROAD RESEARCH 1971. ANNUAL REPORT OF THE ROAD RESEARCH LABORATORY

147P 88REFS

Her Majesty's Stationery Office

Road Res. Lab., Annual reports, Transportation planning, Urban transportation, Traffic research, Transportation studies, Traffic management, Traffic control, Highway safety, Accident analysis, Vehicle safety, Driver behavior research, Pedestrian behavior, Driver aid systems, Highway design, Pavements, Safety programs, Safety research, Accident investigation, Transportation systems, Bridge design, Environmental factors, Highway environmental impact, Tunnel design, Salt effects, Highway construction, Road materials, Highway planning, Public transportation, Highway transportation, Traffic engineering, Highway engineering, Economic analysis, Traffic noise, Child safety, Speed volume relationships

In highway engineering the Laboratory is concerned with the planning, design, construction, and maintenance of roads and highway structures, particularly bridges and tunnels. In traffic engineering and safety the aim is to develop improved methods for the safe, efficient, and convenient movement of people and goods. In transportation research the Laboratory is involved in examining transport operations and their interactions with industrial, commercial, residential, and recreational activities. Selected highlights of work in progress, including automated public transport; economic assessment of alternative policies for traffic restraint; traffic noise; channel tunnel ferry wagons; speed/flow relations on suburban main roads; child safety; car safety program; road salting and vehicle corrosion; rural hydrology; and accelerated methods of testing concrete are presented. Current research, in progress or completed, conducted by the transportation, traffic safety, design, construction, central services, and administration divisions is summarized.

HS-013 560

5. VEHICLE SAFETY

5B. Buses, School Buses, And Multipurpose Passenger Vehicles

MEASURES OF THE LATERAL PLACEMENT OF PASSENGER CARS AND OTHER VEHICLES IN PROXIMITY TO INTERCITY BUSES ON 2 LANE AND MULTILANE HIGHWAYS. FINAL REPORT

Systems Technology, Inc., Hawthorne, Calif.

For primary bibliographic entry see Fld. 2I.

HS-013 556

AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE EFFECT OF BUS-INDUCED AERODYNAMIC DISTURBANCES ON ADJACENT VEHICLE CONTROL AND PERFORMANCE

Systems Technology, Inc., Hawthorne, Calif.

For primary bibliographic entry see Fld. 5R.

HS-013 557

RAILROAD/HIGHWAY ACCIDENT REPORT. PENN CENTRAL FREIGHT TRAIN/SCHOOLBUS COLLISION NEAR CONGERS, NEW YORK, MARCH 24, 1972.

47P Rept. No. NTSB-RHR-73-1, SS-R/H-6

Corporate author

Railroad grade crossing accidents, School bus accidents, Vehicle train collisions, Accident case reports, Accident analysis, Driver error caused accidents, Accident investigation, New York (State), Passenger injuries, Passenger fatalities, Accident diagrams, Accident location, School bus bodies, Environmental factors, Accident factors, School bus drivers, Occupant rescue, Damage, Injury severity, School bus passengers, Traffic laws, Stop signs, Sign effectiveness, Precrash phase, Crash phase, Postcrash phase, Injury causes, Seat belt effectiveness, Human body precrash position

An eastbound school bus was driven across a grade crossing and was struck by the lead locomotive of a northbound freight train. After impact the school bus was driven 1,116 feet down the track by the train, and the body structure of the bus disintegrated. The rear section of the bus was torn loose, fell beside the track, and overturned with a number of students underneath. Five students died, and the bus driver and all 44 remaining students were injured. None of the train crew was injured. The cause of the accident was the failure of the school bus driver to stop at the stop sign until the crossing was clear of railroad traffic. Contributing to the accident was the unnecessary routing of the school bus over a not specially protected railroad/highway grade crossing.

HS-013 558

DESIGN CONCEPT AND DEVELOPMENT OF MAGIRUS-DEUTZ HEAVY DUTY TRUCK LINE

Klockner-Humboldt-Deutz A.G. (West Germany)

For primary bibliographic entry see Fld. 5T.

HS-013 566

DESIGNING A COMPLETE RANGE OF TRUCKS OF 13-44 TON GVW

Empresa Nacional de Autocamiones S.A. (Spain)

For primary bibliographic entry see Fld. 5T.

HS-013 567

FULL-SCALE LABORATORY TESTING

Fiat Auto-Avio Res. Labs., Turin (Italy) F10100

For primary bibliographic entry see Fld. 5D.

HS-013 576

5D. Design

THE FIAT TECHNICAL PRESENTATION

Fiat S.p.A., Turin (Italy)

O. Montabone 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-157--2-184

Accident analysis, Experimental automobiles, Safety cars, Crashworthy bodies, Body design, Fatality rates, Front end collisions, Rear end collisions, Side impact collisions, Rollover accidents, Accident severity index, Damage severity index, Injury severity, Accident investigation, Injuries by accident type, Bar-

Group 5D—Design

rier collision tests, Head on impact tests, Pole impact tests, Rear end impact tests, Side impact tests, Impact velocity, Drop tests, Impact angle, Passenger compartments, Fiat S.p.A., Vehicle weight, Energy absorbing bumpers, Italy, High speed impact tests, Histograms

Results of an analysis of Italian vehicle accidents and barrier collision, pole impact, and drop tests conducted with current Fiat production models were used by Fiat S. p. A. to develop a crashworthy experimental safety vehicle. It was found that severe head on pole impact tests and front and rear barrier collision tests at 15 and 45 provided little significant data in determining the crashworthiness. The design of Fiat's 1500 lb experimental safety vehicle, which includes energy absorbing front and rear bumpers, is outlined, and impact test results are reported.

HS-013 537

ESV DEVELOPMENT AT THE DAIMLER-BENZ A. G.

Daimler-Benz A. G., Stuttgart (West Germany)

H. Scherenberg 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-186--2-193

Experimental automobiles, Safety cars, Automobile design, Vehicle safety standards, Occupant protection, Impact protection, Automobile dimensions, Vehicle weight, Daimler-Benz, Padding, Passive restraint systems

Test results of the Daimler-Benz DBAG Experimental Safety Vehicle (ESV) 05 which led to the development of the DBAG ESV 13 are reported. The ESV 13 includes all safety features of the ESV 05 but is stylistically more acceptable. The improved ESV includes regenerative buffers and a reinforced front and rear body structure, exterior padding at possible pedestrian contact points, and air bag restraint system, passive seat belts for the front seat, increased visibility, and is shorter and wider than the ESV 05. A list of ESV specifications and the degree to which they have been met by the ESV 13 is included. Plans for future development of the ESV are outlined.

HS-013 538

OPEL'S CONCEPT FOR A SAFETY-VEHICLE OF THE LOWER WEIGHT CAR CLASS

Opel (Adam) A.G., Russelsheim am Main (West Germany)
K. Brumm 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-194--2-197

Experimental automobiles, Safety cars, Occupant protection, Energy absorption, Impact tests, Vehicle design, Energy absorbing systems, Vehicle handling, Opel (Adam) A.G.

The main objectives of Opel's experimental safety vehicle program are based on an upper weight limit of 2,200 pounds, the use of conventional materials, and keeping in mind the possibility of high volume production. The present status of the program is discussed. Progress in the areas of energy management, occupant protection, and vehicle control and handling are mentioned.

HS-013 539

THE VOLKSWAGEN ESV

Volkswagenwerk A.G., Wolfsburg (West Germany)
E. Fiala 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicle (3rd) Report, Washington, D. C., 1972 p2-198--2-212

Experimental automobiles, Safety cars, Volkswagenwerk A.G., Vehicle design, Safety design, Automobile safety characteristics, Crashworthiness, Field of view, Automobile dimensions, Knee restraints, Shoulder harnesses, Restraint system design, Vehicle handling, Vehicle performance, Impact tests, Passive restraint systems, Acceleration response, Performance characteristics, Chest acceleration tolerances, Head acceleration tolerances, Automobile costs, Benefit cost analysis, Energy absorbing bumpers, Vehicle lighting

Volkswagen's experimental safety vehicle (ESV) is a four door sedan for four occupants. The general design of the ESV and special safety characteristics are described. The passive restraint system for all passengers consists of a shoulder belt and a knee belt with the preloading mechanism located in the central tunnel. Each has a force limiter. Tests conducted on the ESV are mentioned and some results of impact tests are presented. The Volkswagen ESV is a practical automobile which meets, or exceeds, the ESV specifications. However, the total additional ownership cost of this ESV is estimated to be —5,100. Benefit cost studies indicate that much of the excessive ESV costs come from the high-speed crash requirements of the specifications. Because real-world crashes at these high speeds are rare, the gain in occupant safety is limited despite the high cost of such protection.

HS-013 540

SMALL CAR SAFETY AND ESV SPECIFICATIONS

Nissan Motor Co. Ltd., Yokohama (Japan)

Y. Serizawa 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-223--2-226

Experimental automobiles, Safety cars, Compact automobiles, Automobile dimensions, Automobile design, Accident rates, Fatality rates, Stiffness, Specifications, Nissan Motor Co. Ltd.

Nissan Motor Co. Ltd.'s experimental safety vehicle is a small sized four door sedan. Japanese accident and fatality rates by vehicle type are presented for 1970 and show that a small vehicle is as safe as vehicles of any other size. The main differences between the Nissan 2,500 pound ESV and the 4,000 pound ESV specifications are presented.

HS-013 543

TEST RESULTS AND NISSAN ESV DESIGN

Nissan Motor Co. Ltd., Yokohama (Japan)

T. Maeda 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-227--2-237

Experimental automobiles, Safety cars, Vehicle design, Vehicle characteristics, Nissan Motor Co. Ltd., Performance characteristics, Performance tests, Accident simulation, Restraint system tests, Crush tests, Impact tests, Prototypes, Automobile safety characteristics, Safety design

The different types of tests used to evaluate the Nissan experimental safety vehicle (ESV) are mentioned and the results of tests conducted on the first stage prototypes are presented. The design of the second stage ESV prototype is described.

HS-013 544

OUTLINE OF FIRST PROTOTYPE AND EXPERIMENTAL STUDY

Toyota Motor Co. Ltd., Kariya (Japan)

J. Kawano 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-240-2-249

Experimental automobiles, Safety cars, Toyota Motor Co. Ltd., Vehicle design, Safety design, Prototypes, Vehicle characteristics, Brake system design, Steering system design, Vehicle lighting, Visibility, Interior design, Instrument panel design, Instrumentation, Control location, Engine design, Body design, Crashworthiness, Occupant protection, Energy absorbing front structures, Impact tests, Energy absorbing rear structures, Energy absorbing side structures, Bumper design, Restraint systems, Compact automobiles

The Toyota experimental safety vehicle (ESV) prototype is a two seat sedan with a total loaded height of 1.36 m, overall width of 1.8 m, overall length of 4.3 m, wheelbase of 2.3 m, 1.5 m tread both in the front and in the rear, and a curbweight of approximately 1,150 kg. The ESV brake system, steering and control system, lighting, visibility, instrument and control system, engine, body structure, and occupant restraint systems are briefly described. It is felt that the prototype can accomplish the same safety performance as the full sized car in the areas of vehicle handling and control. However, the severe limits of weight and space in a small sized car present problems in meeting the crashworthiness standards.

HS-013 545

OCCUPANT PROTECTION OF 1,500 POUND ESV

Honda R and D Co. Ltd., Tokyo (Japan)

H. Sugiura 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-250-2-256

Experimental automobiles, Safety cars, Automobile design, Occupant protection, Compact automobiles, Crashworthy bodies, Barrier collision tests, Head on impact tests, Impact velocity, Pole impact tests, Rear end impact tests, Vehicle weight, Crush distance, Computerized simulation, Three point restraint systems, Energy absorbing systems, Restraint system effectiveness, Restraint system tests, Injury prevention, Honda R and D Co. Ltd., Automobile performance, Passenger compartments

Results of head on barrier collision pole impact and rear end impact tests indicate that the Honda R and D Co. Ltd.'s 1500 lb experimental safety vehicle (ESV) does not meet impact speed requirements established in the ESV specifications. In order to improve crash performance the most reasonable solution would be the extension of frontal body length. However, since Honda wishes to keep its ESV small, occupant protection can be improved by reinforcing the passenger compartment, making maximum use of crush distance, and including energy absorbing seat belts. The Honda ESV's injury reduction goals for front end, rear end, and side impact collisions, and rollover accidents are presented.

HS-013 546

EXPERIMENTAL SAFETY VEHICLE--PHASE TWO--DESIGNED AND DEVELOPED BY GENERAL MOTORS

General Motors Corp., Warren, Mich., Environmental Activities Staff

J. W. Rosenkrands 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-257-2-272

Experimental automobiles, Safety cars, General Motors Corp., Vehicle design, Safety design, Automobile safety characteristics, Energy absorption, Occupant protection, Impact tests, Dolly rollover tests, Drop tests, Crashworthiness, Chassis design, Accident avoidance tests, Vehicle handling, Vehicle control, Brake system design, Power trains, Performance tests, Visibility, Restraint system design, Air bag restraint systems, Restraint system tests, Occupant kinematics

Highlights of General Motors Corp.'s experimental safety vehicle (ESV) are discussed. Energy absorbing systems, restraint systems, and chassis design are briefly described. Results of impact tests, dolly rollover tests, drop tests, and accident avoidance and performance tests conducted with the ESV, are presented.

HS-013 547

THE FORD MOTOR COMPANY ESV PROGRAM

Ford Motor Co., Dearborn, Mich.

S. M. Frey 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-273-2-280

Experimental automobiles, Safety cars, Ford Motor Co., Vehicle design, Safety design, Vehicle weight, Crashworthiness, Automobile interior design, Energy absorbing systems, Crashworthy bodies, Bumper design, Occupant protection, Air bag restraint systems, Pole impact tests, Barrier collision tests, Restraint system design

Design features of Ford's experimental safety vehicle (ESV), including energy management systems, bumper design, and restraint systems, are briefly discussed. Results of pole and barrier impact tests conducted on the ESV prototype are presented and the interior and exterior styling is described. Ford's objective of developing an ESV which could be manufactured with present production techniques has not been achieved. Although the outside appearance of the Ford ESV is quite conventional, entirely new design approaches were necessary in many systems to achieve the desired performance levels. The incorporation of these new system designs in the ESV was done on a high cost, experimental fabrication basis, which in many instances deviated considerably from design approaches compatible with proven mass production techniques at reasonable costs.

HS-013 548

UNITED STATES ESV PROGRAM STATUS

Department of Transp., Washington, D.C.

A. J. Slechter 1972

In HS-820 217, International Technical Conference on Experimental Safety Vehicles (3rd) Report, Washington, D. C., 1972 p2-281-2-289

Experimental automobiles, Safety cars, Automobile design, Automobile performance, Crashworthiness, Occupant protection, Automobile dimensions, Impact tests, Anthropomorphic dummies, Impact velocity, Occupant kinematics, Air bag restraint systems, Deceleration, Accident avoidance, Yaw, Steady state, Automobile stability, Lateral acceleration, Vehicle control, Steering, Brake performance, Automobile handling, Pedal

Group 5D—Design

force, Performance tests, Restraint system effectiveness, Fairchild, American Machine and Foundry Co.

The progress of the United States Experimental Safety Vehicle (ESV) Program is briefly reviewed. The dimensions; results of impact tests using anthropomorphic dummies; air bag restraint system effectiveness; steering and braking performance; vehicle handling, stability, and control; and crashworthiness of the American Machine and Foundry Co. and the Fairchild Hiller Corp. ESV's are presented. The goal of the program is improved vehicle crashworthiness and effective passive occupant protection in 50 mph barrier collisions.
HS-013 549

MOTOR VEHICLE FIRE SAFETY

Corporate author

Vehicle fires, Fire prevention, Transportation of hazardous materials, Vehicle safety standards, Federal role, Industries, Flammability tests, Fire extinguishers, Fuel tank location, Crashworthy fuel systems

More than 450,000 fires occurred in private passenger cars and trucks in the United States in 1971. The average loss in those fires was —200, and there were between 3,500 and 4,000 deaths. The National Fire Protection Association has developed standards for transportation of specific hazardous materials by trucks; protection of vehicle occupants from fire; and parking and garaging of trucks. The American Trucking Association and the explosives industry provide information on the prevention of explosions and vehicle fires. Federal Motor Vehicle Safety Standards based on flammability and impact tests cover flammability of interior materials for automobiles, trucks, and buses; fuel system crashworthiness; and fuel tank location.
HS-013 551

PERFORMANCE CRITERIA IN THE DESIGN OF AUTOMOBILE RADARS

General Motors Res. Labs., Warren, Mich.
R. M. Storwick 1973 20p 8refs Rept. No. GMR-1398
Corporate author

Radar, Noise, Electromagnetic interference, Antennas, Target detection, Mathematical analysis

Using well-known results from signal detection theory, the performance of an automotive radar is related to the probability of false alarm (i.e., deciding a target is present when none is present), and the probability of detection. In general, these probabilities will be functions of range and azimuth angle to the target. In the automotive radar systems case it may be necessary to require a somewhat lower probability of false alarm to the left hand side of the automobile, because of the higher density of rapidly moving targets to that side. In particular, the design of antenna patterns is related to these parameters and the desired system performance. An example of this design is given.
HS-013 554

FACTORS AFFECTING THE DESIGN OF TRANSMISSIONS FOR HEAVY-DUTY TRUCKS IN EUROPE

Eaton Transmission Div. Ltd. (England); Eaton G.m.b.H. (West Germany)
J. F. B. Harper, T. R. Radcliffe, H. Klein 1973 24p 25refs Rept. No. SAE-730636

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 June 1973.
SAE

Transmission design, Heavy duty vehicles, European vehicles, Truck design, Vehicle laws, Transmissions, Diesel engines, Gear boxes, West Germany, Great Britain, Political factors, Economic factors, History, Automotive industry, Synchromesh transmissions, Automatic transmissions, Torque converters, Electrohydraulic systems, Forecasting

The evaluation of heavy duty truck transmissions in Europe is traced and factors that have influenced transmission design are identified. Transmissions in current use in Europe are compared and possible lines of further development in the next decade are discussed. The ultimate predominance of any particular truck transmission will be the result of compromise between legislative, economic, and geographic factors. All these influences vary considerably in their effects of European truck manufacture as compared to that in the United States.
HS-013 564

ROAD TRANSPORT IN WESTERN EUROPE--DESCRIPTION OF A TYPICAL RANGE OF VEHICLES AND FUTURE DEVELOPMENTS

Fiat S.p.A., Turin (Italy)
For primary bibliographic entry see Fld. 5T.
HS-013 565

DESIGN CONCEPT AND DEVELOPMENT OF MAGIRUS-DEUTZ HEAVY DUTY TRUCK LINE

Klockner-Humboldt-Deutz A.G. (West Germany)
For primary bibliographic entry see Fld. 5T.
HS-013 566

DESIGNING A COMPLETE RANGE OF TRUCKS OF 13-44 TON GVW

Empresa Nacional de Autocamiones S.A. (Spain)
For primary bibliographic entry see Fld. 5T.
HS-013 567

FUTURE-ORIENTATED DESIGN AND DEVELOPMENT OF COMMERCIAL VEHICLES

Daimler-Benz A.G., Stuttgart (West Germany)
A. Muller-Berner 1973 16p 7refs Rept. No. SAE-730640
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Commercial vehicles, Engine design, Rear axles, Diesel engines, Manufacturing, Economic factors, Engine size, Economic analysis, Power output, Engine performance, Environmental factors, Diesel engine exhaust emissions, Diesel engine noise, Truck design, Bus design, Performance characteristics, Weight to power ratio, Fuel consumption, Production statistics

Economic, safety, and environmental factors affecting the design of commercial vehicles are briefly discussed. Commercial vehicle buyers must be offered a full range of models having various performance and load capacities so that the best tailored vehicle can be chosen for the intended transport operation. In order that such vehicles can be economically manufactured, a well-developed unitary assembly technique is necessary whereby similar components can be used for various models within a series. The modern design layout for the Mercedes-

Benz 400 engine series consisting of in-line and V-engines which have power outputs ranging 130-400 hp in the naturally aspirated version is described. All engines are designed to accommodate turbocharging which will meet the demands for higher engine outputs. Also described are rear axles which have a single load carrying capacity of 9-16 tons and a power transmission capacity of 140-600 hp. Both the axles and the engines are designed for maximum part interchangeability in order to reduce production costs.

HS-013 568

USE OF SIMPLIFIED JACKKNIFE RESTRAINT DEVICE SIGNIFICANTLY REDUCES THE HAZARD OF JACKKNIFING

Breeze Corporations, Inc.

For primary bibliographic entry see Fld. 5T.

HS-013 569

JACKKNIFE CONTROL FOR TRACTOR-TRAILER

Keller Products Co.

For primary bibliographic entry see Fld. 5T.

HS-013 570

A TRANSMISSION SYSTEM FOR SINGLE-SHAFT GAS TURBINE POWERED TRUCKS

Tracor, Inc.

C. E. Kraus, M. E. Gres 1973 7p 1ref Rept. No. SAE-730644

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Transmission design, Gas turbine engines, Variable speed drives, Torque, Flywheels, Performance characteristics, Stalling, Acceleration, Truck design, Automatic transmissions, Fuel economy

A transmission and energy storage and translation system concept is presented which allows a single-shaft turbine driven truck to have comparable performance to one powered with an internal combustion piston engine. The proposed system reduces the acceleration lag and stalling characteristics of a single-shaft turbine driven vehicle, while allowing a very wide torque range to improve the fuel economy of the engine.

HS-013 571

TRANSMISSION FOR AUTOMOTIVE SINGLE-SHAFT GAS TURBINE AND TURBO-RANKINE ENGINES

Mechanical Technology, Inc., Latham, N.Y.

R. C. Bowlin, A. J. Smalley, H. F. Jones, Jr. 1973 15p 4refs Rept. No. SAE-730645

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Hydromechanical transmissions, Gas turbine engines, Rankine cycle engines, Transmission design, Engine performance, Fuel economy, Economic analysis

A study of various transmissions for advanced automotive single shaft gas turbine and turbo Rankine engines led to selection of a variable ratio hydromechanical transmission as the most promising transmission on a near term development basis. Design analysis of this transmission showed that, in comparison with a three-speed automatic transmission, it had approximately the same weight, was 28% smaller in size, and initial production

cost could be 30-40% greater. The comparable weight of the selected transmission suggests that, with future production development, the cost could approach that of the three-speed automatic. The selected transmission offered significant fuel economy advantages for a single shaft gas turbine. For the turbo Rankine engine, the selected hydromechanical transmission offered little performance advantage compared to a conventional automatic transmission, unless future design developments for this type of engine result in increased sensitivity of specific fuel consumption to engine speed.

HS-013 572

PRESENT STATE-OF-THE-ART OF THE PHILIPS STIRLING ENGINE

Philips' Gloeilampenfabrieken N.V., Eindhoven (Netherlands)

H. C. J. van Beukering, H. Fokker 1973 16p 17refs Rept. No.

SAE-730646

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

State of the art studies, Stirling engines, Engine design, Engine performance, Engine heaters, Engine noise, Vibration, Service life, Torque, Exhaust emissions, Philips' Gloeilampenfabrieken N.V., Heating

The progress in research, development, and engineering of the Philips Stirling engine is discussed. After a review of the performance and features of some selected types of engines built and projected at Philips in the last two decades, a survey is given of typical engine characteristics, including efficiency and specific power, heating, noise and vibration, service life, and torque and control.

HS-013 573

FREE-PISTON STIRLING ENGINES-A PROGRESS REPORT

Ohio Univ., Athens

W. Beale, W. Holmes, S. Lewis, E. Cheng 1973 12p 4refs Rept. No. SAE-730647

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Stirling engines, Free piston engines, Engine performance, Engine operating conditions, Heat exchangers, Operating pressure, Creep, Piston rings, Damping, Cylinders, Pumps, Alternators

The concentric piston displacer type of free piston Stirling engine is being developed for use as a gas-fired air conditioner, a long-life isotope powered electric generator, a solar-electric energy converter, a solar water pump, and a classroom demonstrator. A linear alternator-engine combination has demonstrated 8% overall efficiency at a power output of 17 W with 600 K (620F) heater wall temperature. A free cylinder water pump intended for solar energy operation has achieved 6% overall system efficiency using electric heat at 790 K (960F). An engine intended for gas-fired air conditioning has reached 1 kW power output and has demonstrated an ability to self-start on application of heat at 370 K (200F). Some experiments have been made with condensing working fluids capable of producing power at low heater temperature. Several design innovations have been made, including a method of preventing piston position creep, and several means of displacer driving.

HS-013 574

Group 5D—Design

THE STIRLING ENGINE FOR PASSENGER CAR APPLICATION

Ford Motor Co., Dearborn, Mich.; Philips' Gloeilampenfabrieken N.V., Eindhoven (Netherlands)
N. D. Postma, R. Van Giessel, F. Reinink 1973 24p Rept. No. SAE-730648
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Stirling engines, Engine operating conditions, Engine design, Exhaust emission tests, Vehicle performance, Fuel economy, Packaging, Cooling systems, Engine noise, Sound intensity, Starting, Exhaust emissions, Automobile engines

The Stirling engine has potential for inherently low emissions at zero miles, for achieving low noise levels and for excellent fuel economy if it is adequately cooled. Stirling engine performance should be quite similar to that of the baseline untreated engine with good response and driveability. The Stirling engine can be packaged within the length of a conventional engine compartment with some modifications to the vehicle. The primary problem is accommodation of the large radiator required for adequate cooling. Major unresolved issues in Stirling engine development are cooling system requirements, use of hydrogen as a working fluid, maintenance of low emissions for 50,000 miles, and manufacturing and facilities costs. A prototype engine is being designed and built for installation in a 1975 Ford Torino.

HS-013 575

FULL-SCALE LABORATORY TESTING

Fiat Auto-Avio Res. Labs., Turin (Italy) F10100
E. Franchini, C. Rossi, P. Filippa 1973 12p 1ref Rept. No. SAE-730649
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Vehicle riding qualities, Laboratory tests, Road simulators, Vibration tests, Fatigue tests, Loading (mechanical), Vibration measurement, Truck tests, Bus tests, Vehicle mass, Suspension system spring rates, Damping, Power spectral density, Truck cabs, Fatigue (materials), Chassis tests

Vibrations of automobiles and buses and the fundamental motions of truck sprung masses were measured, and cab and chassis fatigue tests were conducted on the Fiat road simulator. The instrument has been effective in identifying vibration sources that induce fatigue or discomfort or which may cause inefficient operation or a breakdown.

HS-013 576

TUNING TECHNIQUES FOR CONTROLLING HEAVY-DUTY TRUCK SHAKE--VERTICAL, TORSIONAL, AND LATERAL

Isuzu Motors Ltd., Tokyo (Japan)
For primary bibliographic entry see Fld. 5K.
HS-013 577

ECONOMIC IMPACT OF MASS PRODUCTION OF ALTERNATIVE LOW EMISSIONS AUTOMOTIVE POWER SYSTEMS

International Res. and Technology Corp., Washington, D.C.
For primary bibliographic entry see Fld. 5F.
HS-013 578

AN EXPERIMENT ON CAR SIZE EFFECTS IN TRAFFIC

For primary bibliographic entry see Fld. 2I.
HS-013 596

WHERE PHILIPS STANDS ON THE STIRLING ENGINE--1

Automotive Engineering v81 n7 p37-43 (Jul 1973)
H. C. J. van Beukering, H. Fokker 1973
Based on SAE-730646, 'Present State-of-the-Art of the Philips Stirling Engine'.
Automotive Engineering v81 n7 p37-43 (Jul 1973)

Stirling engines, Seals, Engine performance, Engine operating conditions, Heating, Engine noise, Exhaust gas recirculation, Combustion, Noise control, Acoustic measurement, Sound intensity, Service life, Torque, Exhaust emissions, Engine design, Engine heaters

The invention of the rhombic drive and the roll-sock seal have led to serious consideration of the external combustion Stirling engine as a substitute for the internal combustion engine. The combination of properties that make the Stirling engine worth this consideration are: overall efficiencies in the 30-40% range; external heating, which makes the engine highly independent of the kind of heat source, and also leads to clean exhaust gases, an inherently quiet engine with extremely low vibration; long life; and excellent torque and control characteristics.

HS-13 594

EFFECTIVENESS OF AUTOMOTIVE OCCUPANT RESTRAINTS

National Hwy. Traf. Safety Administration, Washington, D.C.
For primary bibliographic entry see Fld. 5N.
HS-820 279

5F. Fuel Systems**A SPARK IGNITION ENGINE WITH AN IN-CYLINDER THERMAL REACTOR**

Wisconsin Univ., Madison
A. J. Jessel, O. A. Uyehara, P. S. Myers 1973 15p 10refs Rept. No. SAE-730634
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Exhaust emission control, Spark ignition engines, Thermal reactors, Engine modification, Exhaust gas recirculation, Controlled combustion systems, Exhaust emission tests, Nitric oxide, Carbon monoxide, Hydrocarbons, Intake valves, Poppet valves, Engine design, Exhaust emission control device tests

A method and apparatus intended to minimize hydrocarbons (HC), carbon monoxide (CO), and nitric oxide (NO) in spark ignition engine exhaust by utilizing the unused displacement of the engine at part loads as an internal thermal reactor are described. The method used is to induct exhaust gas plus air into one portion of the cylinder and unthrottled fuel-air charge into the balance. The fuel-air charge is rich to minimize NO formation, but, as a result, the products of combustion contain HC and CO. Air is added to these products before re-induction to provide additional oxygen to complete the oxidation which is promoted by the high pressures and temperatures of compression and combustion. Load control is achieved by varying the relative amounts of fuel-air charge and recirculated exhaust.

Experimentally, it was shown that the necessary stratification existed until the spark occurred but not thereafter. The very low NO concentrations expected were realized, but HC and CO values were higher than desired.
HS-013 563

ECONOMIC IMPACT OF MASS PRODUCTION OF ALTERNATIVE LOW EMISSIONS AUTOMOTIVE POWER SYSTEMS

International Res. and Technology Corp., Washington, D.C.
R. U. Ayres, S. Noble 1973 456 (3v) refs Rept. No. IRT-287-R
Contract DOT-OS-20003 (Amended)
Final Report for Jul 1971-Mar 1973. Includes 3 volumes. Subcontracted to United Aircraft Corp. and Faucett (Jack) Associates.
NTIS

Low emission vehicles, Low emission engines, Economic analysis, Engine conversion, Exhaust emission control, Otto cycle engines, Rankine cycle engines, Turbine engines, Exhaust manifold reactors, Dual bed catalyst systems, Automobile conversion costs, Automotive industry, Consumer demand forecasting, Employment, Maintenance costs, Repair costs, Labor, Foreign trade, Petroleum industry, Federal role, Fuel consumption, Crude oil, Engine design, Automobile costs, Automobile manufacturing, Vehicle age, Fuel economy, Vehicle operating costs, Exhaust emission standards, Matrix reduction, Mathematical analysis, Computer printouts

The possible effects on the transportation industry, satellite industries, the labor market, and the economy which may be anticipated if mass production of unconventional low emission automotive propulsion systems should occur are considered. A postulated 1976 Otto Cycle Internal Combustion Engine equipped with a dual catalyst manifold reactor and other conventional emission control devices was compared in detail with a Regenerative Free Turbine Engine and a Rankine Cycle Engine. Manufacturing costs, operating and ownership costs, consumer demand, inter-industry effects, employment, resource requirements, and international trade implications were analyzed in depth under a number of plausible sets of policy constraints and parametric variations. Principal conclusions are that conversion over a 10 year period is feasible, that manufacturing cost differentials are less critical than fuel consumption and cost differentials, that industry employment impacts are minor, and that resource/trade effects are dominated by petroleum imports. Implications for Federal policy are discussed.
HS-013 578

5J. Lighting Systems

THE HSRI PART-TASK DRIVING SIMULATOR FOR RESEARCH IN VEHICLE REAR LIGHTING AND RELATED STUDIES

Michigan Univ., Ann Arbor. Hwy. Safety Res. Inst.
For primary bibliographic entry see Fld. 3D.
HS-013 555

5K. Maintenance And Repairs

TUNING TECHNIQUES FOR CONTROLLING HEAVY-DUTY TRUCK SHAKE--VERTICAL, TORSIONAL, AND LATERAL

Isuzu Motors Ltd., Tokyo (Japan)
T. Inoh, M. Aisaka 1973 22p 8refs Rept. No. SAE-730650

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Vibration control, Tuneup, Truck design, Frame design, Truck cabs, Loading (mechanical), Torsional vibration, Spring rates, Stiffness, Vibration tests, Lateral acceleration, Mathematical models, Truck tests, Frame tests, Body mounting

The components involved in the solution of the shake problem in a heavy duty truck are the frame/cargo-body structure, the cab mounting, and the powerplant mounting. The method followed in this experiment was a three-dimensional mathematical model analysis using a transfer matrix. The theoretical estimates showed appreciable correlation with the experimental results obtained by using a electrohydraulic shaker system. This technique, based upon a study of the effects of various components on the three modes of shake, was applied to production trucks and produced favorable results.
HS-013 577

5N. Occupant Protection

ESV DEVELOPMENT AT THE DAIMLER-BENZ A. G.

Daimler-Benz A. G., Stuttgart (West Germany)
For primary bibliographic entry see Fld. 5D.
HS-013 538

THE VOLKSWAGEN ESV

Volkswagenwerk A.G., Wolfsburg (West Germany)
For primary bibliographic entry see Fld. 5D.
HS-013 540

OUTLINE OF FIRST PROTOTYPE AND EXPERIMENTAL STUDY

Toyota Motor Co. Ltd., Kariya (Japan)
For primary bibliographic entry see Fld. 5D.
HS-013 545

OCCUPANT PROTECTION OF 1,500 POUND ESV

Honda R and D Co. Ltd., Tokyo (Japan)
For primary bibliographic entry see Fld. 5D.
HS-013 546

EXPERIMENTAL SAFETY VEHICLE--PHASE TWO--DESIGNED AND DEVELOPED BY GENERAL MOTORS

General Motors Corp., Warren, Mich., Environmental Activities Staff
For primary bibliographic entry see Fld. 5D.
HS-013 547

THE FORD MOTOR COMPANY ESV PROGRAM

Ford Motor Co., Dearborn, Mich.
For primary bibliographic entry see Fld. 5D.
HS-013 548

UNITED STATES ESV PROGRAM STATUS

Department of Transp., Washington, D.C.
For primary bibliographic entry see Fld. 5D.
HS-013 549

EFFECTIVENESS OF AUTOMOTIVE OCCUPANT RESTRAINTS

National Hwy. Traf. Safety Administration, Washington, D.C.

Group 5N—Occupant Protection

C. Y. Warner, G. D. Hunter, A. L. Burgett, T. A. Hoyt 1973 43p
52refs
Presented at National Transp. Engineering Meeting, Tulsa, 9-13
Jul 1973.

Office of Crashworthiness, Attn: Dr. Burgett, National Hwy.
Traf. Safety Administration, Washington, D. C. 20590

Restraint system effectiveness, Injury prevention, Fatality prevention, Restraint system tests, Three point restraint systems, Air bag restraint systems, Air belt restraint systems, Occupant kinematics, Vehicle fixed object collisions, Side impact collisions, Rollover accidents, Rear end collisions, Front end collisions, Test volunteers, Impact velocity, Accident case reports, Vehicle design, Safety design, Accident survivability, Barrier collision tests, Dummies, Seat belt slack, Seat belt caused injuries

Extensive use of three point restraint systems now installed in cars is the best short-range solution to accident caused injuries and fatalities, but will prevent less than 40% of fatalities and injuries. Three point restraint systems offer limited protection in frontal crashes above 30 mph, and have not been proven to be superior to other systems in nonfrontal modes. Biomechanical studies and actual accidents with air bag restraint system fleet vehicles have demonstrated that air bags offer increased injury and fatality prevention. Structural improvements will be needed, in consonance with advanced restraints, for crash survival at equivalent barrier speeds above 40 mph. Vehicle systems which provide crash survivability at equivalent barrier speeds above 40 mph could prevent more than 75% of the fatalities and injuries which may otherwise be predicted to occur in automobile crashes.

HS-820 279

AN ASSESSMENT OF THE PERFORMANCE OF BELT RESTRAINT SYSTEMS IN AUTOMOBILE CRASHES

National Hwy. Traf. Safety Administration, Washington, D.C.
C. Y. Warner, W. A. Boehly, A. L. Burgett, T. A. Hoyt 1973?
69p 63refs

Office of Crashworthiness, Attn: Dr. Burgett, National Hwy.
Traf. Safety Administration, Washington, D. C. 20590

Seat belt effectiveness, Three point restraint systems, Injury prevention, Fatality prevention, Accident studies, Injury research, Accident severity, Human acceleration tolerances, Human body impact tolerances, Seat belt loading, Submarining, Seat belt caused injuries, Rear end collisions, Biomechanics, Impact velocity, Impact forces, Injury severity, Restraint system usage, Animal experiments, Test volunteers, Cadavers in testing, Front end collisions, Occupant kinematics, Side impact collisions, Rollover accidents, Seat belt regulations, Restraint system design, Accident statistics, Acceleration response

Belt restraint systems have proven effective in the prevention of injuries associated with automobile accidents. Properly worn belts can significantly improve the odds of survival in a crash. Recent accident studies in the U. S. and Europe, together with biomechanical test results, indicate that conventional lap/shoulder belt systems are most effective in low-to-moderate crash severities, but are somewhat ineffective in frontal collisions more severe than a 30 mph fixed-barrier impact. The primary benefit of belt restraints in side and rollover collision modes is the prevention of ejection. However, other means of preventing ejection are also proving to be effective. Extrapolation of available data from the Australian mandatory belt use

legislation suggests that U. S. fatalities would be reduced by less than 40%, even with 100% lap/shoulder belt use.
HS-820 286

5R. Steering Control Systems

EXPERIMENTAL SAFETY VEHICLE--PHASE TWO--DESIGNED AND DEVELOPED BY GENERAL MOTORS

General Motors Corp., Warren, Mich., Environmental Activities Staff

For primary bibliographic entry see Fld. 5D.
HS-013 547

AN EXPERIMENTAL AND ANALYTICAL INVESTIGATION OF THE EFFECT OF BUS-INDUCED AERODYNAMIC DISTURBANCES ON ADJACENT VEHICLE CONTROL AND PERFORMANCE

Systems Technology, Inc., Hawthorne, Calif.

D. H. Weir, R. H. Hoh, R. K. Heffley, G. L. Teper 1972 169p

14refs Rept. No. STI-TR-1016-1, PB-220 091

Contract FH-11-7570

NTIS

Aerodynamics, Vehicle control, Vehicle performance, Buses, Aerodynamic configurations, Crosswind, Passing, Overtaking, Speed, Lateral vehicle spacing, Vehicle width, Wind tunnel tests, Model tests, Vehicle handling, Performance tests, Computerized simulation, Driver performance, Station wagons, Driver skills, Wakes, Bus design, Boundary layer, Trailers, Campers (truck mounted), Ground clearances, Instrumented vehicles, Instrumentation, Equations of motion, Vehicle dynamics, Yaw, Roll

Full scale experiments, wind tunnel tests, and driver/vehicle/disturbance response and performance analyses of bus-induced aerodynamic disturbances on adjacent vehicles were conducted. Results are expressed in terms of overall driver/vehicle performance, with emphasis on steering control and side to side deviations of the disturbed vehicle's path. The situations studied involve a station wagon and an inter-city bus, a two lane road, overtaking and passing, and vehicle-bus oncoming. Bus width and shape, lateral separation and lane width, ambient wind magnitude and direction, vehicle-bus speeds, and driver skill and alertness were varied. Several other disturbed vehicles involving different aerodynamic shapes and handling properties were also considered. Attention was given to the effect of increasing bus width from 96 to 102 inches. Results are interpreted in terms of possible actions and remedial implications in highway design, bus size and configuration, and driver/vehicle handling dynamics and control characteristics.

HS-013 557

USE OF SIMPLIFIED JACKKNIFE RESTRAINT DEVICE SIGNIFICANTLY REDUCES THE HAZARD OF JACKKNIFING

Breeze Corporations, Inc.

For primary bibliographic entry see Fld. 5T.

HS-013 569

JACKKNIFE CONTROL FOR TRACTOR-TRAILER

Keller Products Co.

For primary bibliographic entry see Fld. 5T.

HS-013 570

FULL-SCALE LABORATORY TESTING

Fiat Auto-Avio Res. Labs., Turin (Italy) F10100
For primary bibliographic entry see Fld. 5D.
HS-013 576

5T. Trucks And Trailers

FACTORS AFFECTING THE DESIGN OF TRANSMISSIONS FOR HEAVY-DUTY TRUCKS IN EUROPE

Eaton Transmission Div. Ltd. (England); Eaton G.m.b.H. (West Germany)
For primary bibliographic entry see Fld. 5D.
HS-013 564

ROAD TRANSPORT IN WESTERN EUROPE--DESCRIPTION OF A TYPICAL RANGE OF VEHICLES AND FUTURE DEVELOPMENTS

Fiat S.p.A., Turin (Italy)
D. Filtri, F. Pinolini 1973 14p Rept. No. SAE-730637
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Freight transportation, Trucks, Vehicle weight, Truck design, European vehicles, Foreign commercial vehicles, Truck cabs, Truck cab interiors, Truck brakes, Engine performance, Truck performance, Gear boxes, Vehicle weight limits, Truck specifications, Vehicle characteristics, Diesel engine exhaust emissions, Forecasting

The importance of light and medium trucks in European road haulage is stressed, taking into account the geographic characteristics, the existing road network, and the regulations presently in force. A typical range of light, medium, and heavy trucks are then described as an illustration of the characteristics required. Future developments are considered with respect to foreseeable regulations for vehicle weight and dimensions, weight to power ratios, safety, and pollution requirements.
HS-013 565

DESIGN CONCEPT AND DEVELOPMENT OF MAGIRUS-DEUTZ HEAVY DUTY TRUCK LINE

Klockner-Humboldt-Deutz A.G. (West Germany)
H. W. Hahn 1973 20p 6refs Rept. No. SAE-730638
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Truck design, European vehicles, Foreign commercial vehicles, Bus design, Construction vehicles, Off the road vehicles, Standardization, Manufacturing, Frame design, Diesel engines, Engine design, Transmission design, Transfer cases, Clutches, Gear boxes, Front axles, Rear axles, Axle loads, Axle housings, Suspension system design, Springs, Air suspension systems, Truck cabs, Air cooled engines, Klockner-Humboldt-Deutz, A.G. (West Germany)

European truck users prefer vehicles for which all main components are made by one producer. Thus, manufacturers must design and produce these components for their entire line. Moreover, a high percentage of export models consists of variations required by government regulations and customer demands. Obviously, satisfying domestic and foreign trade would not be economically feasible unless many components were interchangeable throughout the line. Magirus-Deutz has solved

this problem by adopting the modular concept for a new range of vehicles, from 11-32 ton off- and on-highway trucks to 130-340 hp air cooled buses with a 15-row seating capacity. The application of this concept to the design of frames, engines, clutches and transmissions, driven front and rear axles, axle suspension and springing, transfer cases and cabs of trucks, buses, and fire fighting equipment is described.
HS-013 566

DESIGNING A COMPLETE RANGE OF TRUCKS OF 13-44 TON GVW

Empresa Nacional de Autocamiones S.A. (Spain)
C. Carreras, J. P. Clar 1973 12p Rept. No. SAE-730639
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Truck design, Frame design, Truck cabs, Bus design, Rear axles, Tilt cabs, Engine performance, Steering system design, Suspension system design, Engine tests, Durability tests, Performance tests, Production statistics, Standardization, European vehicles, Foreign commercial vehicles, Vibration tests

Profile, frame, engine, rear axles, and cab design are described for a new line of trucks with a maximum interchangeability of parts in order to meet customer requirements and export market regulations with least cost and yearly production of 15,000-25,000 vehicles. Performance tests, truck cab vibration tests, and rear axle durability tests were performed. The first year's production statistics are presented.
HS-013 567

FUTURE-ORIENTATED DESIGN AND DEVELOPMENT OF COMMERCIAL VEHICLES

Daimler-Benz A.G., Stuttgart (West Germany)
For primary bibliographic entry see Fld. 5D.
HS-013 568

USE OF SIMPLIFIED JACKKNIFE RESTRAINT DEVICE SIGNIFICANTLY REDUCES THE HAZARD OF JACKKNIFING

Breeze Corporations, Inc.
R. E. Walsh, G. E. Cicchetti 1973 6p Rept. No. SAE-730642
Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973.
SAE

Jackknifing, Tractor trailers, Vehicle control, Truck stability, Braking, Performance tests, Brake torque, Lane changing, Truck design, Panic stops, Wet road conditions, Antijackknifing devices

A simple jackknife restraint device which is integrated with the vehicle's normal braking system controls against the hazard of jackknifing in tractor trailer operations. The jackknife control mechanism is composed of a drum, wire rope tension member, drum retraction spring, brake, and a wire rope bridle. Operation of the control is explained in terms of geometry of installation. Results of performance tests of the control, including high speed lane changing maneuvers on wet road surfaces, and braking tests on a foam covered runway indicate good vehicle stability.
HS-013 569

JACKKNIFE CONTROL FOR TRACTOR-TRAILER Keller Products Co.

Field 5—VEHICLE SAFETY

HSL 73, No. 24

Group 5T—Trucks And Trailers

A. T. Keller 1973 6p Rept. No. SAE-730643

Presented at Combined Commercial Vehicle Engineering and Operations and Powerplant Meetings, Chicago, 18-22 Jun 1973. SAE

Jackknifing, Tractor trailers, Vehicle control, Performance tests, Lane changing, Panic stops, Steering, Truck stability, Truck design, Road conditions, Antijackknifing devices

A method had been developed to stop jackknifing of all tractor trailer vehicles by controlling the angle between the tractor and the trailer to a maximum of 15 of movement to either side. Most jackknifing occurs when the driver is forced into an unexpected lane change or into a panic stop to avoid an accident. Tests have proved that when a tractor trailer is in a 25 or more angle, the vehicle is then in an angle of no return and a jackknife can occur. When road conditions are unfavorable, due to rain, ice, or snow, the jackknife will be more severe. The prototype unit has been subjected to over 350 jackknife stops, under all kinds of road conditions, at speeds of 25-60 mph without any breakage, failures, or wear.

HS-013 570

A TRANSMISSION SYSTEM FOR SINGLE-SHAFT GAS TURBINE POWERED TRUCKS

Tracor, Inc.

For primary bibliographic entry see Fld. 5D.

HS-013 571

FULL-SCALE LABORATORY TESTING

Fiat Auto-Avio Res. Labs., Turin (Italy) F10100

For primary bibliographic entry see Fld. 5D.

HS-013 576

TUNING TECHNIQUES FOR CONTROLLING HEAVY-DUTY TRUCK SHAKE--VERTICAL, TORSIONAL, AND LATERAL

Isuzu Motors Ltd., Tokyo (Japan)

For primary bibliographic entry see Fld. 5K.

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